Poverty Alleviation and Environmental Conservation through adoption of Appropriate Housing Improvement Technologies (AHITs): a case study of the Appropriate Housing Improvement Technologies developed by Building and Construction Improvement Program in the Northern Areas of Pakistan

by

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Author’s Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

This paper is an attempt to determine the impacts of Appropriate Housing Improvement Products (AHITs) on poverty alleviation and environmental conservation with special reference to the housing improvement technologies/techniques developed and introduced by the Building and Construction Improvement Program (BACIP) of the Aga Khan Planning and Building Service, Pakistan (AKPBSP) in the Northern Areas of Pakistan.

A general methodology was employed in this research based on exploratory and evaluative investigation using both primary and secondary data. The primary data was collected through a series of open ended interview questionnaires. The use of open ended questionnaires enabled the researcher to collect both quantitative as well as qualitative data from the interview questionnaires. Some additional qualitative data was collected through focus group discussions. The secondary data was collected from various published and unpublished reports and also from the internet.

The paper begins with an introduction about the context and the program. The literature review identifies some basic concepts and approaches to poverty, and appropriate technologies, followed by the methodology that was adopted for the study. Chapter four presents the environmental setting of the study area that provides a context for analysis and chapter five present an assessment of the AHITS, with an emphasis on its role in alleviating poverty and environmental conservation in the study area, mostly through the lens of quantitative and qualitative research. Finally, the findings of the study are presented.

In conclusion, recommendations are made to upgrade the effectiveness and efficiency of AHITs and to expand the impacts of the program outside its source of origin, covering a larger geographic area. In this way not only the people of the Northern Areas of Pakistan will be able to alleviate poverty in the region but people living in other regions having similar socio-economic and environmental conditions will also be able to reduce their unwanted expenses caused by poor housing conditions.

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Glossary of Acronyms

ADB	Asian Development Bank
AKDN	Aga Khan Development Network
AKHSP	Aga Khan Health Service, Pakistan
AKRSP	Aga Khan Rural Support Program
AKPBSP	Aga Khan Planning and Building Service, Pakistan
AHITs	Appropriate Housing Improvement Technologies
ARI	Acute Respiratory Infection
BACIP	Building and Construction Improvement Program
BHU	Basic Health Unit
CC	Cement Concrete
CIB	Council for Research and Innovations in Building
CIDA	Canadian International Development Agency
CWIQ	Core Welfare Indicators Questionnaire
FES	Fuel Efficient Stove
GDP	Gross Domestic Product
GI	Galvanized Iron
GNP	Gross National Product
GoP	Government of Pakistan
HDI	Human Development Index
HDR	Human Development Report
IDR	Institute of Development Research
ITDG	Intermediate Technology Development Group
IUCN	International Union for Nature Conservation
Kg	Kilogram
KKH	Krakuram High Way
Km	Kilometer
LPG	Liquefied Petroleum Gas
MTC	Mobile Training Course
NGO's	Non-governmental Organizations
NWFP	Northwest Frontier Province
PPAF	Pakistan Poverty Alleviation Fund
RHWs	Roof Hatch Windows
RCC	Reinforced Cement Concrete
Rs	Rupees
SBP	State Bank of Pakistan
SL	Sustainable Livelihood
UK	United Kingdom
UNCRD	United Nations Center for Regional Development
UN-DHA	United Nations Department of Humanitarian Affairs
UNDP	United Nations Development Program
UNHRP	United Nations Human Rights Program
USA	United States of America
USAID	United States Agency for International Development

WB	World Bank
WWF	World Wide Fund for Nature Conservation
WI	Wall Insulation
WWG	Water Warming Geyser

CHAPTER 1: INTRODUCTION

1.0 Introduction

The Northern Areas of Pakistan, (renamed on August 9, 2009 as Gilgit-Baltistan http://ibnlive.in.com/news/pak-renames-the-northern-areas-as-gilgitbaltistan/100292-2.html), lies in the extreme north of Pakistan (See Map Appendix IV). It is one of the poorest regions of the country. According to Aga Khan Rural Support Program (AKRSP) (2002), in the Northern Areas despite of high population growth rate (2.7% per annum) cultivated land per capita is constantly increasing. In 1997, average per person cultivated landholding was 0.11 hectares (33%), which increased to 0.13 hectors in 2003. The main reason for this increase in cultivated landholding was development of irrigation channels for reclamation of barren land. In the Northern Areas, per capita income is only Rs. 44 (US $ 0.72 per person per day), which is equal to 56% of the national average (AKRSP, 2003). The level of poverty in the region is reflected in housing conditions. Ninety percent of houses are cold, dark, damp, dusty, smoky, non-ventilated, unhygienic, structurally unstable, and congested. Women and children under the age of five, who spend majority of their time inside the house, suffer most from these poor housing conditions. For most members of the community, current housing conditions are a major part of their poverty burden (AKPBS, 2003).

The effect of poor housing also manifests itself in other aspects of community life that further exacerbate the conditions of poverty afflicting the region in the following ways:

1. Four of the major health-related problems in the region – pneumonia, acute respiratory infections, eye infections and diarrhea/ dysentery – account for over

50% of all reported cases at health centers. These problems are directly related to living conditions inside houses (AKHSP, 2000).

2. Poor housing conditions unduly increase household expenditure:

   a. Poor health caused by smoke, dust, dampness, unhygienic conditions, etc. cost households an annual average of Rs.1,920 or US $ 31 (4% of the household's annual cash expenditure) for health care (Sedky and Abid, 2003);

   b. Due to a lack of insulation and use of inefficient stoves, each family uses about 4.5 tons of fuel wood annually for heating the house and cooking food, costing a typical family on the average Rs.4,500 annually, 9% of the household's annual cash expenditure(Ahmed and Abbasi 2001);[1]

   c. With the virtual disappearance of high-quality wood for structural reinforcement of traditionally built houses, current houses are built with low-quality wood. As a result, houses have poor structural strength and require an annual recurrent expenditure of Rs. 2,500 (5% of household's cash expenditure) per house to remain minimally livable (AKRSP, 2003).

In effect, the cost of maintaining a house (i.e. heating and repairing it), and treating the illnesses that arise from living in sub-standard dwellings, accounted for about 16% of all household annual expenditures in 2001, a four hundred percent increase in just te

[1] *This is the average for all the households in the study area. About 35% of the households purchase all their wood at the average cost of Rs. 11,500 while 45% do not purchase any wood, with the remaining 20% purchasing their partial requirements.*

,year.[2] Moreover, these housing-related costs were the fastest growing household expenditure for communities in the Northern Areas of Pakistan between 1991 and 2001. For the same period, the household expenditure for education increased from 4.8% to 7.2%, less than two-fold (AKRSP, 2002).

In short, the communities in Northern Pakistan are caught in a vicious cycle; poor housing conditions lead to ever-higher expenditures, poorer health status, increased level of poverty and unsustainable growth, while increased levels of poverty lead to worsening housing conditions.

In 1997, the Aga Khan Planning and Building Service, Pakistan (AKPBS,P) initiated the Building and Construction Improvement Program (BACIP), in order to promote measures that enable poor and isolated communities of the Northern Areas and Chitral regions of Pakistan to make sustainable improvements in their housing-related living conditions.

BACIP conducted participatory research on the issues and developed a variety of practical and affordable low cost housing improvement technologies (AHITs) that were designed to improve domestic living conditions through thermal insulation, better illumination, ventilation and improved space organization. A total of 60 AHITs were identified. Fifty have been tested in the field for promotion and replication. Thirteen AHITs are designed to enhance the fuel and thermal efficiency of the rural houses. These products complement fuel wood and forest conservation practices and reduce emission of green house gases into the environment. Five of the 20 home improvements were

[2] *This assumes that 50% of the annual household health care expenditure (Rs. 960) is due to housing related issues.*

designed to directly improve the quality of life of women and children, reducing the time and effort required to carry out household chores and facilitating a more comfortable, healthy and productive environment. Various studies have substantiated that the BACIP products improve health, benefit women, reduce indoor air pollution by emitting less smoke, and contribute to environmental conservation (Khan, 2003, AKPBSP, 2007).

Some of the technologies and their associated benefits are listed below:

1. Roof hatch window: Improves light and ventilation, saves fuel wood and helps in reduction of acute respiratory infections promoted by dust and cold;
2. Wall insulation techniques: Increases thermal efficiency of the house, reduces dust and saves fuel wood and reduces cold related diseases;
3. Fuel efficient stoves: Improves fuel efficiency, saves fuel-wood, emit less smoke inside the house and helps in reduction of smoke related diseases;
4. Water warming Geyser: Eases domestic chores, primarily done by women, saves fuel and reduces smoke;
5. Solar cooker: Saves fuel wood by cooking food using solar energy;
6. Solar water heater: Warm water for washing and bathing using solar energy;
7. Light roofs: Improves domestic health conditions, reduces dampness and saves fuel wood and recurrent house repair costs; and
8. HDGI wire wall reinforcement: Makes walls more durable and stronger in resisting earthquake forces; allows multiple storey construction.

To make the process sustainable, BACIP gave special attention to the training and capacity enhancement of local entrepreneurs, artisans and general community members. Other program related activities include: a) research and development of products that improve the domestic environment and structural stability of houses; b) field testing of the products for acceptability and functionality; c) documenting the products and their manufacturing techniques; and d) promoting the products for mass scale replication (Khan, 2003, AKPBSP, 2007).

1.1 Nature of the Study

The aim of this research has been to assess the impacts of BACIP-AKPBSP appropriate housing improvement technologies (AHITs) on poverty alleviation and environmental conservation. Assessment of the impacts in light of the target population's perception is the salient feature of this study. The present research study's unit of analysis is individual households using the AHITs for the last few years.

1.2 Rationale for the Research

Poverty cannot be understood and addressed outside its national and regional contexts (McKinley, 2001). Any practical approach to reducing poverty must start with a definition that is valid for that particular context. Attention must be paid to removing the causes of poverty rather than alleviating symptoms of deprivation (Khan, 1996).

Poverty is conventionally measured through income or expenditure levels. The 'poverty line' sets a measure below which people do not have access to sufficient resources to meet their basic needs for food, water and shelter. The 1990 *World Development Report (WDR)* used an upper poverty line of US $ 370 a year as a cut-off point for absolute

poverty. Those whose consumption levels fall below are poor. The *WDR* also used a lower poverty line of US $ 275 and those whose income level fall below this point are considered extremely poor. According to AKRSP (2000) the average per capita in the Northern Areas was US $260 which is even less than the lower poverty line of the World Bank. This shows the prevalence of extreme poverty in the region.

Chambers (1999) and others (Arnold, Chambers, and Longhurst 1981; Chambers, and Conway 1992; Chambers 1999; Cornwall, and Gaventa 2001; and Gordon 2004) pointed out that it is not possible to measure poverty simply through income or consumption deficiencies. These authors argue that real poverty can not be assessed through statistical measures. Yet measurable indicators do provide a comparative picture of poverty. Health, education, life expectancy, access to clean water, food and shelter are all important determinants of poverty and well being.

Poverty is a complex problem. While there is much debate about causes and solutions, one thing on which there is agreement is that there is no easy or low cost solution to poverty alleviation. The literature determines some basic contextual elements within which certain factors lead to poverty, which include:

- geography – mostly poor people live in remote rural areas, typically characterized by poor soils, extreme climates, lack of a developed irrigation system, and short fallows (MacKay, and Lawson 2003);
- social trends –such as health, education, birth rate, family size, age of parents, education of parents etc (Cameron, 2002);

- labour market conditions – such as the unemployment rate, wage levels and seasonality of jobs; and
- government policies – such as taxation and provision of health and education facilities etc. (Innovative Research Center, 2005).

Interventions designed to address the impacts of poverty for one specific group or area will not ensure general poverty reduction. For reducing poverty, there must be long, medium and short term strategies in different sectors of the economy.

Shelter, one of the key indicators of poverty, is agreed to be a basic human right for every individual, but we still live in a world where more than one billion people live in inadequate housing conditions. Governments have legal responsibility to "take steps by all appropriate means" to provide this human right to its citizens. The Vienna Declaration 1993 World Conference on Human Rights indicates that: *"Everyone has the right to a standard of living adequate for health and well being of himself or [herself] and his or [her] family, including food, clothing, housing and medical and necessary social services...."* (UN Habitat, 2000).

In developing countries, this declaration of human rights has not received full recognition. Since people do not have access to education and other social services, they are not aware of this fundamental right. The Vienna declaration is not getting full recognition and remains a low priority (UNHRP, 2002).

The construction sector provides direct and indirect benefits to a variety of people in the community. On a global scale, the construction sector and housing industry share 10-12% of GDP and 7% of employment. The housing and construction industry has massive

forward and backward linkages in the economy. According to recent estimates 35-40 industries are related to this sector. The construction industry has great employment generation potential. It can create low paid jobs for labourers, and ordinary construction workers, medium paid jobs for masons, carpenters, plumbers, electricians, painters and highly paid jobs for architects, planners, engineers, and designers (Government of Pakistan, 2004).

For poverty reduction, different organizations of the world have adopted different interventions, for example: provision of irrigation projects, rural link roads, provision of health and education facilities. Introducing new technologies and reducing production costs is another way to tackle the situation, but the literature on poverty alleviation suggests that even with a paradigm shift from general economic development to targeting the poor, still the accessibility of the poor to the program benefits is low as compared to other comparatively richer groups (David Pots, et al., 2003). Literature also suggests that the poor have less access to programs, and therefore, benefit less from social or economic development. According to Cummings (2003), correlation exists between the economic status of the household and accessibility to program benefits. Two possible ways of reducing global poverty are commonly promoted: one is to increase household disposable income and the other is to cut down on unproductive household expenses. Investment in housing improvements or low cost housing for the poor frees up resources for them to invest in other activities thus contributing to a reduction in their poverty (BACIP, 2000).

1.3 Significance of the Study

As awareness in development circles and among academicians about world poverty grows, their concern about doing whatever is possible to contain the problem and

mitigate its severity is increasing (Mahmood, 2005). Mahmood (2005) pointed out that national governments and international development agencies have realized over time that world poverty has not lessened in some of the least developed areas, despite decades of effort and huge investment of resources. The present study examines one approach to reducing extreme poverty and establishes a linkage between poverty alleviation and the adaptation of appropriate low cost housing improvement technologies. It also fills a literature gap regarding the relationship between poverty and low cost housing improvement technologies.

This study makes some contribution to development practitioners, policy analysts and rural researchers who are particularly interested in impact assessment studies with specific focus on sustainable rural development; rural housing, skill enhancement, poverty alleviation, and conservation of natural resources particularly forest resources of developing countries. The methods developed and used for the impact assessment will be specifically helpful for the policy makers of the Aga Khan Development Network (**http://www.akdn.org**) working in twenty four countries spread over four continents including Asia, Africa, Europe and North America. Results of this study will also provide guidance to public sector organizations in preparing poverty alleviation and environmental conservation policies and strategies. The study addresses a gap in the literature by documenting how rural people in one locality define well being and impoverishment. This study also provides an analytical procedure for the assessment of the impacts of appropriate technologies on poverty reduction. Findings of the study are expected to help the rural poor not only living in the Northern Areas of Pakistan but also

in other regions and to reduce their spending on fuel-wood buying, costs of maintaining a house in a livable condition, and health bills.

1.4 Goal of the Study

The appropriate housing improvement technologies (AHITs) developed and introduced by AKPBSP - BACIP, are designed to make a significant contribution to reducing the use of firewood, levels of smoke inside houses and emission of greenhouse to environment, the amount of money spent on buying fuel wood, and also time spent on collecting and chopping fuel wood for heating and cooking. The present research has evaluated the effectiveness of these products that will determine the functionality and accessibility of AHITs. It has also evaluated the effectiveness of the various training modules provided by BACIP to individuals in the Northern Areas. The present research has also focused on the awareness and demand generation strategies of BACIP for the mass scale replication of AHITs.

The overall goal of the present study is to assess the social, economic and environmental impacts of installing AHITs in selected households in 8 villages in the Northern Areas of Pakistan.

1.5 Research Questions

i. Do AHITs have an impact on alleviating poverty in the study area?

ii. Do AHITs have a positive impact on the forest resources of the study area leading to environmental conservation?

iii. Can the effectiveness of AHITs can be enhanced? If so how?

iv. What do the study results suggest about whether AHITs may be useful in other regions of Pakistan and abroad for reducing poverty and enhancing environmental conservation?

1.6 Structure of the Study

The present research study is divided in six chapters. The first chapter provides an introduction to the context which includes statement of the research problem, significance of the research, formulation of goals and objectives and development of research questions. Chapter two describes the methodology developed for under taking research study. Chapter three deals with the review of existing literature on poverty related concepts. Environmental setting of the Northern Areas has been described in chapter four. Analysis of the data and findings of the study has been given in chapter five, while chapter six deals conclusion of the study and research recommendations.

CHAPTER 2: RESEARCH DESIGN AND METHODOLOGY

2.0 Introduction

This chapter provides a brief description of the research design and methodology. A conceptual methodology (as shown in Figure 2.1) was developed for the research process. It presents the research approach, research design and the methodology for data collection and analysis.

2.1 Research Approach – case study research

The purpose of this study is to identify the impacts of Appropriate Housing Improvement Technologies (AHITs) on poverty alleviation and environmental conservation. Another important aspect of the study is to identify parameters for the potential dissemination of AHITs to other regions of Pakistan, and abroad. These AHITs have already been developed and implemented in the Northern Areas of Pakistan since 1997 by a non-governmental organization.

2.1.1 Rationale for case study research

A case study approach was selected because the research problem is related to a specific program, working in a specific geographical area. According to Creswell (2008), case studies are useful for explaining processes, activities, and events. Patton (2002) agrees, and adds that cases offer contained units of analysis- and are unique, specific, and bounded. Case studies, although somewhat confined in their applicability to outside situations, provide the opportunity to take a holistic approach to research (Stake, 2006, Patton 2002). Case studies are flexible regarding what type of data is collected, as both qualitative and quantitative data can be used in order to achieve an understanding of the

case and its issues (Stake, 2006). Further study of other cases can provide an opportunity to compare or reflect upon any one case study. Case studies cannot be used to generalize situations for overarching issues (Stake, 2006), but can provide understanding of a particular set of problems and how they are experienced and addressed.

2.1.2 Types of case study research

Stake (1995) identified three types of case study research:

i. **Intrinsic case study**: This type of research is undertaken because the researcher wants better understanding of the particular case. Here, it is not undertaken primarily because the case represents other cases or because the case illustrates a particular trait or problem, but because, in all its particularity and ordinariness, the case itself is of interest. The researcher is less interested in making generalizations about a phenomena or problem and the researcher is not interested in theory building. Most consultative research cases present intrinsic cases.

ii. **Instrumental case study:** The researcher deeply examines a phenomenon or issue so as to redraw generalizations and identify exceptions or to contextualize general knowledge. In the instrumental approach, the problem itself is of secondary importance, and the main purpose of the study is to advance knowledge about the broader subject or to develop theory based on the findings of the study.

iii. **Collective case study:** This type of research is mainly instrumental, extended to several cases. Individual cases in the collection may or may not be known in advance to manifest some common characteristics. They may be similar or dissimilar, redundancy

and variety are each important. They are chosen because it is believed that analysis will lead to better understanding, or perhaps theorizing, about a still larger collection of cases.

The present study is an instrumental case study. The researcher was interested in suggesting whether it is possible to draw generalizations from the findings of the study and to consider whether it is possible to develop a framework that will help to transfer AHITs to other regions, as one means of addressing the issues of poverty and global climate change.

2.2 Context and Situation

The Building and Construction Improvement Program (BACIP) is a project of the Aga Khan Planning and Building Service, Pakistan (AKPBSP). AKPBSP is an institution of the Aga Khan Development Network (AKDN) and has been working in the Northern Areas of Pakistan, since 1997. For the last 12 years (1997 – 2009) BACIP has been working in about 126 villages (106 villages in the Northern Areas and 20 villages in Chitral district of NWFP as shown on the map, Appendix IV). The majority of these villages are remote and difficult to access. Due to financial and time constraints, 8 villages were selected for this research.

2.3 Criteria for Evaluation

Keeping the research questions in mind, relevant literature was reviewed, broadly covering recent studies in poverty, sustainable development, sustainable livelihoods and resource conservation (See Chapter 3). Based on the literature review the researcher identified some key criteria to be used in evaluating AHITs impacts and assessing their effectiveness in alleviating poverty and environmental conservation. For the purpose of

analysis and collection of data from the field, each criterion was further divided into sub-factors. These criteria also provided the basis for constructing interview questions. Some of the criteria are listed below:

1. Size and structure of the family
2. Size and structure of the house
3. Household income from all sources
4. Household expenses before and after installation of AHITs:

    a. buying fuel wood for heating and cooking;

    b. expenses on annual house repair/construction cost;

    c. expenses on ARI related diseases.

5. Incidences of smoke and cold related diseases in the household before and after the installation of AHITs

6. Time spent before and after AHITs:

    a. fuel wood collection and chopping;

    b. house construction / repair;

    c. attending hospital or doctor.

7. Level of perceived comfort in the house before and after the installation of BACIP AHITs including:

    a. Temperature;

    b. Level of smoke;

    c. level of illumination inside the house; and

    d. reduction in soot, fungus and dampness inside the house.

2.4 Methods for Data Collection

The research relied on multiple sources of data including secondary data, collected from various sources. Primary data was collected from the field in May, and June of 2008.

2.4.1 Collection of Secondary Data

Secondary data was collected from various sources including publications of the Government of Pakistan, and data from Aga Khan Rural Support Program (AKRSP) which is the first non-governmental organization in the area. AKPRSP has been working in the Northern Areas since 1980 and has published a number of reports on the area's physical, social, economic and environmental conditions. Other non-governmental organizations (NGOs) from which secondary data were collected includes the International Union for Nature Conservation (IUCN) Northern Areas chapter, World Wild Fund (WWF), Aga Khan Health Services (AKHSP), and Karakuram Development Organization (KADO). Some information was also collected from reliable internet sources such as the Population Census Organization of Pakistan, State Bank of Pakistan (SBP), World Bank (WB), and United Nation Habitat and other agencies.

2.4.2 Collection of Primary Data

During the data collection period (summer, 2008) BACIP was actively working in two districts of the Northern Areas Gilgit and Ghizer. In the study area, personal interviews and focus groups were used to collect primary data. Due to shortage of time and resources it was not possible for the researcher to collect data from all 40 project villages; therefore data was collected from only eight villages (two villages per valley). The main

criteria for the selection of a village were its population, accessibility by road, at least 20% households have installed one or more AHITs, where AKPBSP (BACIP) has conducted a minimum of one training module and where BACIP has been working for more than three years. As the people in the selected villages had been using these AHITs for at least 3 years, it was possible for the researcher to document the experience of the users.

Two different semi-structured open-ended questionnaires were used to guide interviews. One questionnaire was prepared with the intention of using it for gathering data from users and non-users of AHITs, while the second questionnaire was developed for interviewing skilled and semi-skilled individuals who had received skill enhancement training from BACIP (See Appendix II, III and IV). An effort was made to organize questions in each questionnaire in a manner and sequence that would simplify the process and minimize missing responses to questions (Dillman, 1978, Presser etal., 2004 and Dillman, Smyth, and Christian 2008). The researcher collected both quantitative and qualitative data through the interview process. The use of open ended questions provided an opportunity for the researcher to incorporate personal experiences and perceptions of the interviewees.

For the collection of interview data, the author visited the program area in May, and June of 2008 and spent about a month in the field. The majority of the people residing in the Northern Areas of Pakistan have no formal education. As they do not know other languages except their own local dialect and as the researcher did not know the local dialects, two research assistants were hired to assist with translation and interviews and also conducting interviews to expedite the process of data collection. During the

fieldwork, the researcher visited eight villages in four different valleys and conducted 240 interviews, along with 49 additional interviews of artisans with the help.

2.4.3 Focus Group Discussions

Focus group discussions are a powerful tool for collecting community and other stakeholders' perceptions. The focus group discussion is

> *"an exploratory research tool - a 'structured group process' conducted for the purpose of exploring people's thoughts and feelings and obtaining detailed information about a particular topic or issue (Sherraden, 2001). Focus group discussions generally last from an hour and a half to two hours (NOP website), longer than this and the discussion loses momentum (Sherraden, 2001). If the discussion is well managed, it allows deep-seated feelings on a subject to emerge naturally (down loaded on April 4, 2008 from* http://www.chronicpoverty.org/page/toolbox-focus-interviews).

The researcher organized three focus group discussions with professionals such as civil engineers, architects and planners, artisans like tinsmith, carpenters and stove makers and general community members. A separate questionnaire (See Appendix III) was used to guide focus group discussions.

The first group discussion was held in Gilgit town on Monday May 19, 2008 and lasted for about two hours. This group discussion was attended by seven professionals including civil engineers, architects, builders, environmentalists, and economists. The second focus group discussion was held on May 25, 2008 in Gulmit, one of the BACIP program villages in upper Huza. This group discussion was attended by fourteen individuals including the local village leader (locally known as *numberdar*), political representatives, users of AHITs, and skilled and semi-skilled village artisans. The last focus group discussion was held on May 31, 2008 in the town of Ghizer, also the district

headquarters. This group discussion was attended by eleven individuals and lasted for about ninety minutes. These group discussions provided additional data on various dimensions of the impacts of AHITs.

During the field survey (2008) besides conducting interview questionnaires and focus group discussion, the researcher also interviewed a number of professionals including engineers, doctors, economists and social scientists to have in-depth understanding of the issue of poverty alleviation and environmental conservation and identify possible answers for the research questions. The research recommendations are mostly based on the information gathered in focus group discussions and also interview these professionals. These professionals were working in various government and non-governmental organizations including;

i. General Manager, Aga Khan Health Services, Pakistan (Northern Areas),

ii. Head International Union for Nature Conservation (IUCN), Pakistan, (Northern Areas),

iii. Head World Wide Fund (WWF), Pakistan, (Northern Areas),

iv. Divisional Forest Officer (DFO), Gilgit,

v. Executive Engineer (Xen), Public Works Department, Gilgit,

vi. Program Manager Building and Construction Improvement Program, Giligt, and

vii. Program Manager Habitat Risk Management Project

2.5 Data Analysis

During the field survey (summer 2008) both qualitative and quantitative primary data were collected. The data were studied and appropriately edited, preserving their accuracy and quality. The quantitative data were analyzed using analytical techniques of descriptive statistic like means, ratio and percentages. The results were presented in the form of bar, line and pie charts along with tabular data.

The qualitative data were collected both in the form of written text and also the conversation was recorded using a digital recorder. The data that were produced in the form of audiotapes was transcribed in to a written text. This text was analyzed using thematic analysis techniques, which included coding, theme development, developing of description and its interpretation and the networking diagrams.

The first step in thematic analysis is to collect the data. Audiotapes and field notes were used for this purpose (Spradley, 1979). The researcher is not familiar with local dialects, therefore, with the help of a translator first the audiotapes were translated into Urdu and then to English language. In the next step transcribed and patterns of experiences were listed, using direct quotes or paraphrasing of common ideas.

The next step in thematic analysis was to identify all data that relates to the already classified themes and sub-themes (households income and expenditure, pattern of fuel wood collection and consumption – environmental conservation, frequency of diseases in surveyed households indoor living conditions before and after the installation of AHITS). Further, identified patterns are then explored. All of the discussions that fit under the specific pattern were identified and placed with the corresponding pattern.

Figure 2.1: Process Designed for Analysis of Qualitative Data

Source: Based on Aronson, J. (1994) thematic analysis

A further step in thematic analysis was combining and cataloging related sub-theses into themes. Themes are distinct units derived from patterns such as "conversation topics, vocabulary, curring activities, meanings, feelings, or folk sayings and proverbs" (Taylor & Bogdan c b, 1989, p.131). Themes are developed and identified by "bringing together components or fragments of ideas or experiences, which often are meaningless when viewed alone" (Leininger, 1985, p. 60). Themes, which emerge from the informants' stories, are pieced together to form a comprehensive picture of their collective experience (Leininger, 1985). Emerging themes were further discussed during focus groups (Aronson, J. 1992).

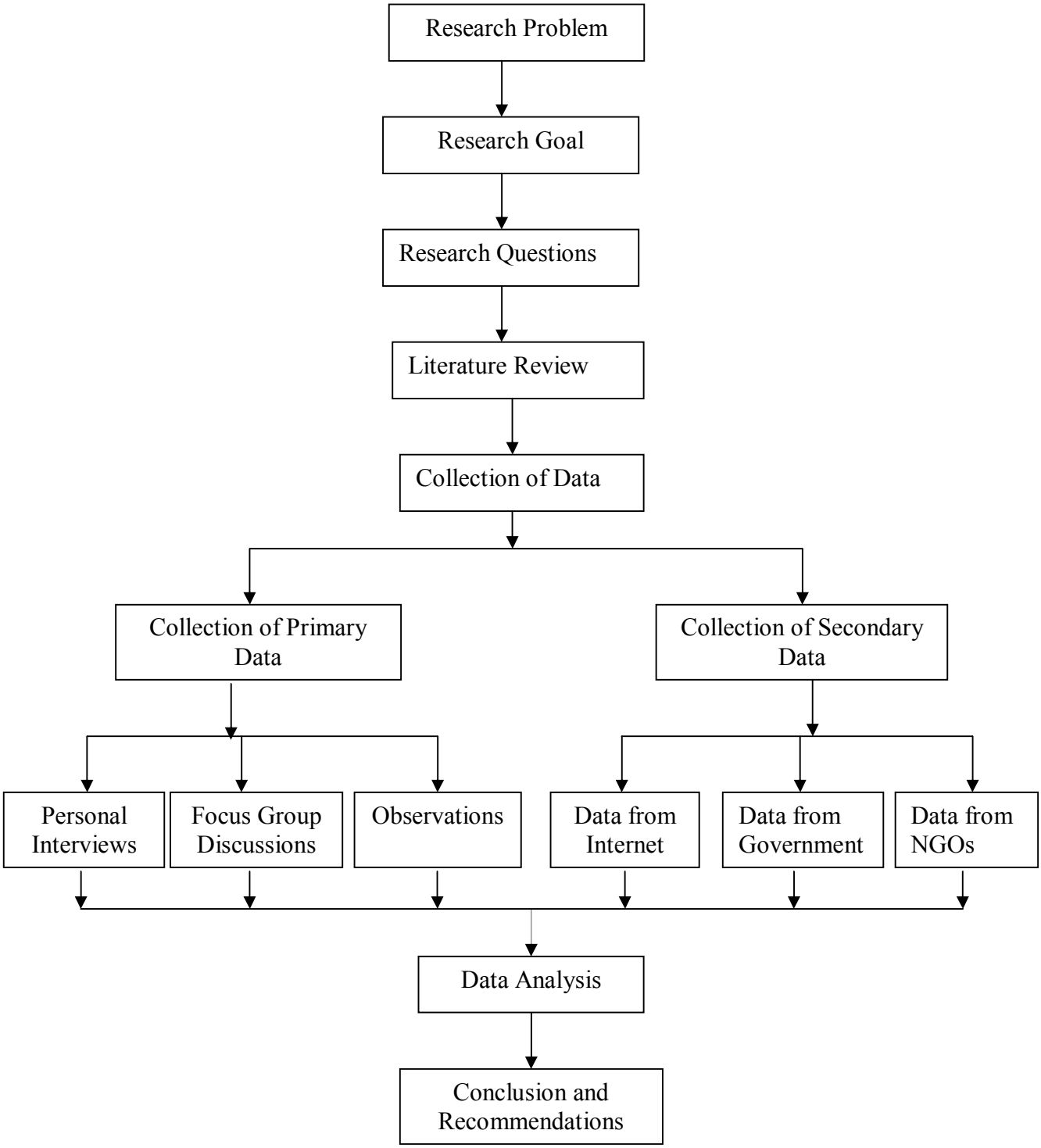
2.6 Limitations and Constraints

- The data collection took place during the months of May and June 2008, when most households spend a much greater time outdoors and are less affected by the AHITs installed and the real time observation was not possible. A combination of two to three housing improvements is expected to have a much greater impact on a family's socio-economic and health conditions, but the number of houses where more than one product has been installed is limited.
- Although the sample size of 240 houses with AHITs from 8 project villages is reasonable, due to financial and time constraint it was not possible for the

researcher to collect data from more project villages to increase the accuracy and reliability of data.

- In the case of health impacts of AHITs, the results are based on what the respondents could recall as opposed to clinical examinations or direct observations. In terms of the disease morbidity, the results may be less accurate although it also presents what is most pressing in terms of people's own perceptions about health, housing, and wellbeing.
- One of the most challenging jobs for the researcher was the collection of recent secondary data about various aspects of the study area. In Pakistan the last census was conducted in 1998 and after 1998 no census data is available. Due to non-availability of census data, data about population, poverty, housing, and other important parameters was collected from other government and NGOs offices. These data sets were not compatible with each other and comparisons among the various data sets were not possible.
- Some of the qualitative data collected from the field was recorded in their local dialect, which was translated into Urdu with the help of research assistance. For analysis the researcher translated these responses from Urdu into English. Therefore, there is a possibility that the research assistance has missed some important information while translating from local language into Urdu and the same is true for the researcher.

Figure: 2.1 Methodology of the study



CHAPTER 3: LITERATURE REVIEW

3.0 Introduction

This chapter provides a brief description of the concept of poverty and various other thoughts associated with poverty. This chapter consists of three sections. The first section deals with the concept of poverty and associated perceptions, the second section deal with approaches developed for alleviating poverty and the final section provides a brief summary of the whole discussion.

3.1 Concepts and Definitions

3.1.1 Concepts of Poverty

Thinking about poverty can be traced back at least to the codification of poor laws in medieval England, through to pioneering empirical studies, at the turn of the twentieth century, by Booth in London, England and by Rowntree in New York, USA. Rowntree's study, published in 1901, was the first to develop a poverty standard for individual families, based on estimates of nutritional and other requirements (Maxwell, 1999).

In the 1960s, the main focus of poverty research was on the level of income, reflected in macro-economic indicators like Gross National Product (GNP). This was accompanied by a policy emphasis on economic growth. In the 1970s, poverty became a prominent topic of consideration worldwide, in particular as a result of Robert MacNamara's speech to the World Bank Board of Governors in Nairobi in 1973, and the subsequent publication of *Redistributio ;/n with Growth* (Singer, and Jolly 1975). The pioneer work f Runcima and Townsend (1970) on relative deprivation, helped to redefine poverty: not

just as a failure to meet minimum nutrition or subsistence levels, but rather as a failure to keep up with the standards prevalent in a given society (Maxwell, 1999).

Sen (1982) described poverty as a situation in which people lack the economic resources to realize a set of some basic functions. Commonly the terms used to describe poverty are (i) income or consumption poverty, (ii) human under development, (iii) social exclusion, (iv) ill-being, (v) lack of capability and functioning, (vi) vulnerability, and (vii) relative deprivation.

Maxwell (1999), suggests that new layers of complexity were added to the concept of poverty in early 1980 in the following ways:

(a) A new interest in vulnerability, and its counterpart, security, associated with better understanding of seasonality and of the impact of shocks, notably drought. This pointed to the importance of assets as buffers, and also to social relations (the moral economy, social capital). It led to new work on coping strategies;

(b) The incorporation of non-monetary aspects, particularly as a result of Robert Chambers' work (1983) on powerlessness and isolation. This helped to inspire greater attention to participation;

(c) Theoretical work in welfare economics by Amartya Sen (1983), emphasized that income was only valuable in so far as it increased the 'capabilities' of individuals and thereby permitted 'functioning' in society;

(d) An understanding of the concept of poverty within a wider construct, sustainability. This was adopted by the Brundtland Commission on Sustainability and the Environment (1987), which popularized the term sustainable development;

(e) The 1980s was characterized by a rapid increase in the study of gender. The debate moved from a focus on women alone (women in development-WID), to wider gender relations (gender and development-GAD). Policies followed to empower women and find ways to underpin autonomy, or agency (Maxwell, 1999).

The decade of the 1990s saw further developments in the concept of poverty. The idea of 'well-being' came to be a metaphor for absence of poverty, with concomitant emphasis on how poor people themselves view their situation. Therefore, the definition of poverty should be based on standards and conventions that exist in a particular community (Karel, 2001). At the same time, inspired by Haq[3], the United Nations Development Program (UNDP) developed the idea of Human Development: 'opportunities and choices… to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and the respect of others...' (UNDP, 2000, Chapter 1, p.20).

By the turn of the twenty first century, it was generally accepted that poverty is multidimensional (Narayan, Chambers, and Petesch, 2000).

Khan (2004) states that poverty is complex and multidimensional and has been challenging for developmental practitioners both in developed and developing countries to define in any explicit way. The World Summit for Social Development in Copenhagen (1995) and the Millennium Development Goals (MDG 2000) also based on the idea that poverty is multidimensional, and refers to a lack of economic, human, political, socio-cultural and productive capabilities (OECD, 2001). Ahmed (2005) is of the view that poverty commonly refers to the whole spectrum of deprivation and ill being.

[3] Dr. Mahboob ul Haq, a Pakistani economist, fathered the concept of human development: an appropriate measure of national wellbeing and set the foundation for HDI (Government of Karnataka, 1999)

The meaning and assessment of poverty are important because they may drive explanations for the cause of poverty, which in turn may determine the solution proposed (Ahmed, 2005). Definitions of poverty vary from context to context. Karel (2001) is of the view that the definition of poverty should be contextual, based on standards and conventions that exist in a particular community (Karel, 2001). Pouw (2004) believes that being poor means not having enough to eat; not being able to provide for your family or yourself (Pouw, 2004).

The World Bank defines poverty as:

> *"Poverty is hunger. Poverty is lack of reasonable shelter. Poverty is being sick and not being able to see a doctor. Poverty is not having a job, is fear for the future, living one day at a time. Poverty is losing a child to illness brought by unclean water. Poverty is powerlessness, lack of representation and freedom"* (World Bank, 2000, p.2).

A similar approach was adopted by Naresh Singh (1999):

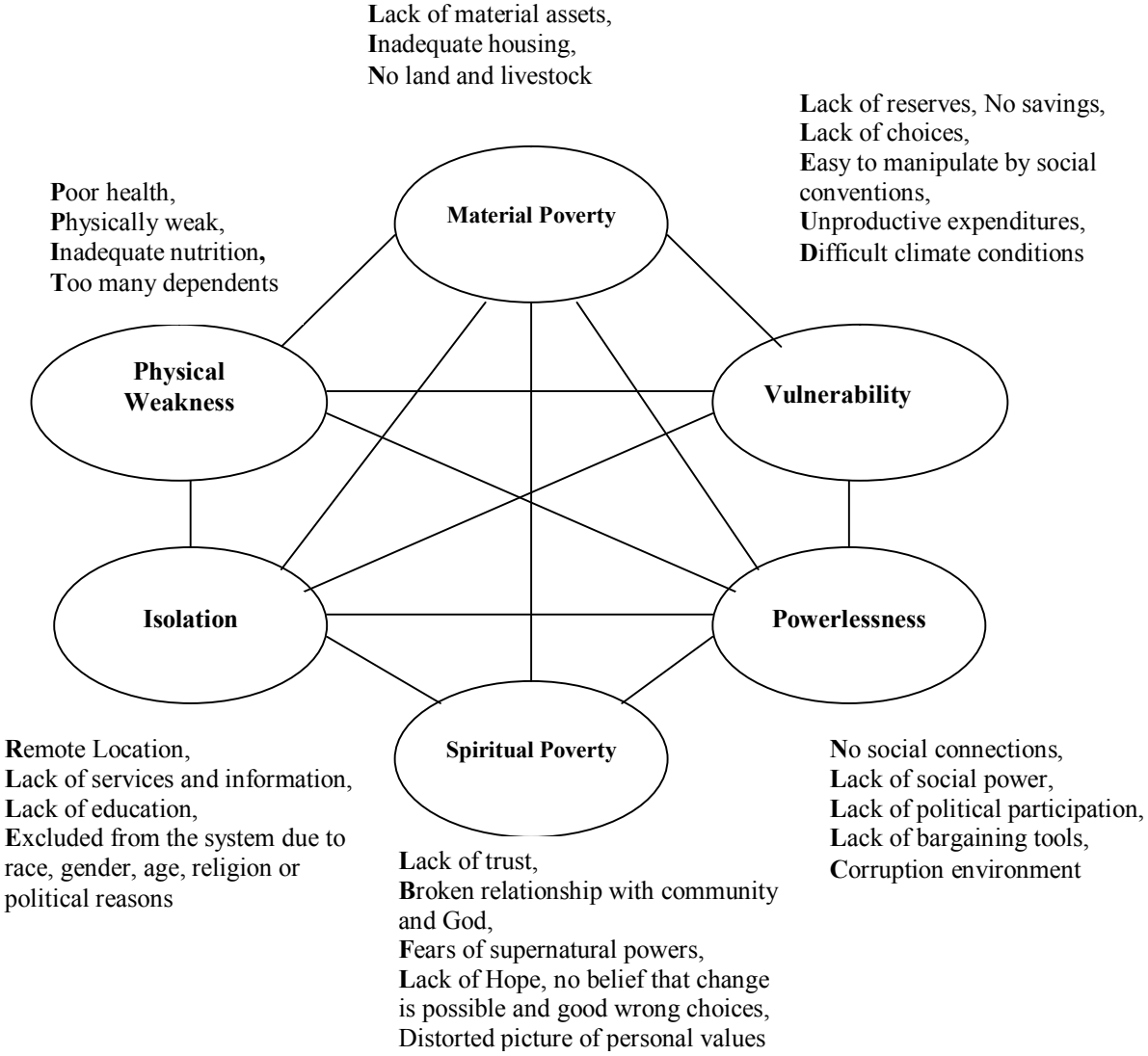
> *"Poverty has many faces. It is much more than low income. It also reflects poor health and education, deprivation in knowledge and communication, inability to exercise human and political rights and absence of dignity, confidence and self-respect. There is also environmental impoverishment and impoverishment of entire nations, where essentially everyone lives in poverty. Behind these faces of poverty lies the grim reality of desperate lives without choices, and often governments lacking the capacity to cope"* (Singh, 1999, p.2).

To define poverty, identify its causes and to develop guidelines for the reduction of poverty, in 1990 the World Bank started a project called *the Voices of Poor* (Petesch et al. 2000). Under this project in 1999, a study called '*Crying Out for Change'* was conducted (ibid). The main purpose was to redefine poverty using participatory appraisal techniques. In this study around 20,000 people from 23 different countries of various regions were interviewed to record their own personal perspective of poverty, its causes and how it can be alleviated (ibid). The study identified ten interlocking dimensions of poverty from the perspective of the poor. These are:

- Usually poor people are hungry, exhausted, sick and weak in appearance;
- Gender relations are fragile and unequal;
- Social relations are biased, discriminating and isolated;
- No peace of mind due to insecurity and lack of protection;
- People believe in personal empowerment rather than institutional empowerment;
- Behavior of the rich and powerful is marked by disregard and abuses;
- Livelihoods are inadequate or seasonal;
- Weak social organization;
- Lack of information, education, skills and confidence; and
- Geographically located in isolated, risky, un-serviced and stigmatized places (Petesch et al. 2000)

From a similar perspective, Paul Mosley and E. Dowler (2003) mapped the complex nature of poverty, which is given below Figure 2.1:

Figure 2.1: Diagrammatic representation of the complex nature of poverty.



Source: Mosley P. and Dowler E., 2003

3.1.2 Absolute and Relative Poverty

Absolute poverty refers to some absolute standards of minimum requirement, while relative poverty refers to falling behind most others in the community. With respect to come, an individual is poor if his/her income is less than the defined income poverty line for his/her country or region, while he/she is relatively poor if (s)he belongs to a bottom income group such as the poorest 10% (HDR, 1997, p.13). Based on the international

standard of the World Bank a person is absolutely poor if he is earning less than one US dollar (Purchasing Power Parity – PPP) per day (HDR, 1997 and WBR 2008).

The relationships between absolute and relative poverty are dynamic. Some times they move in the same direction, while in some cases these trends may move in opposite directions. For example, relative poverty may decline while absolute poverty increases if the gap between upper and lower strata of a population is reduced by a decline in well being of the former at the same time that some additional households fall beneath the absolute poverty line (Singh, 1999).

Most developing countries have set their own national poverty lines. Food poverty is the most commonly used method for accessing the level of poverty around the globe. These lines indicate the insufficiency of economic resources to meet basic minimum needs in food. There are three approaches to measuring food poverty (Singh, 1999). In 1999 the Planning Commission of Pakistan decided that the official poverty line for Pakistan will be estimated on 2350 calories per adult equivalent per day. This is based on an adult equivalent intake of 2150 calories in the urban areas and 2450 calories in the rural areas. The poverty line for Pakistan for the year 1999 on this basis has been defined at Rs. 670 (US $ 16.34[4]) per capita per month (ADB, 2002), while the estimated poverty line for the year 2005 was Rs. 990 and Rs. 778 per capita per month for urban and rural areas respectively (Jamal 2005 and 2007).

Certain combinations of vulnerability may be strongly correlated with poverty, such as female-headed households or families living in remote and isolated mountainous regions. Poverty relates to deprivation, while vulnerability is a function of external risks, shocks,

[4] In 1999 the exchange rate was Rs.41 = US $ 1

stresses and internal defenselessness (Paul, 1994). Not all members of a particular vulnerable group are invariably poor-hence there is a need to distinguish between poor and vulnerable while dealing with indicators. The high degree of correlation between certain combinations of vulnerabilities and poverty is increasingly leading development practitioners toward using the former as proxies for poverty. This can prove useful when trying to ascertain general estimations of the extent of poverty. However, using a vulnerability indicator as a proxy for poverty necessitates careful analysis to determine the degree of correlation and regular testing to ascertain its validity over time (Renata, 2002). The identification of vulnerable elements within the poor has received little attention in poverty assessment studies in Pakistan (ADB, 2002). According to Asian Development Bank – ADB (2002), the two important aspects of vulnerability are economic vulnerability, which in its traditional sense means underlying susceptibility of economically deprived people to fall into poverty as a result of exogenous random shocks. Thus vulnerability is the ex-ante risk of falling below the poverty line In this context, vulnerable households are generally found to have low mean expenditure levels coupled with a high variance of expenditure. Essentially households are vulnerable if they do not have the means to smooth out consumption expenditure in response to fluctuations in income.

3.1.3 Poverty and Inequality

Whereas poverty refers to different forms of deprivation that can be expressed in a variety of terms (i.e., income, basic needs, human capabilities), equity is concerned with distribution within a population group. Despite the clear distinction between the two concepts, analysis of poverty often employs indicators of equity because of inherent

linkages between the two concepts. Recent studies have concluded that in certain country contexts it is easier to reduce poverty under relatively egalitarian conditions (Renata, 2002).

The association of poverty and inequality indicators is done in a number of ways. As the international development community develops indicators for its broadened understanding of poverty, measures of equity are increasingly used alongside poverty indicators in order to capture a more complete picture of the situation (Renata, 2002).

3.1.4 Poverty and Underdevelopment

The distinction between poverty and underdevelopment also depends on how each is defined. When poverty is defined in broad human deprivation terms, it is often viewed as a form of underdevelopment (Ahmed, 2005). The UN Human Development Report (1997), distinguishes between the two concepts by associating the former with individuals and the latter with an aggregate perspective:

"The contrast between human development and human poverty reflects two different ways of evaluating development. One way, the 'conglomerative perspective,' focuses on the advances made by all groups in each community from the rich to the poor. This contrasts with an alternative viewpoint, the derivational perspective, in which development is judged by the way the poor and the deprived fare in each community. Lack of progress in reducing the disadvantages of the deprived cannot be 'washed away' by large advances-no matter how large-made by the better-off people" (UNDP, 1997, p.15).

3.1.5 Poverty and Exclusion

There is no broad consensus on the definition of social exclusion, or its relationship to poverty. At one end of the spectrum, there are those who define social exclusion within the concept of poverty, focusing on those aspects of social deprivation that impede people from participating fully in their society and its development. At the other end of the spectrum, there are those whose notion of social exclusion encompasses a much broader range of issues, including poverty itself. Needless to say, between these two extremes lies a range of different approaches to the concept.

Definition of social exclusion depends to a great extent on how one defines poverty. If one's definition of poverty were narrow, expressed in terms of material deprivation (such as lack of income), then it would not be surprising that the definition of social exclusion would be considered in broad terms, including material deprivation. If, however, one's definition of poverty is multidimensional, then it is likely that social exclusion would refer more specifically to issues of participation, empowerment and social rights (Renata, 2002).

According to Khan (2005), exclusion refers to the level of participation in society. Exclusion and inclusion are relative to the society in question. They are multi-dimensional and include income/consumption, poverty as well as involvement in productive activity, political participation and social interaction. Inclusion and exclusion are dynamic processes, which happen over time. They are multi layered and operate at different levels: individual, household, neighborhood, community, and institution etc (Khan, 2005).

According to Mahmood (2005), exclusionary biases work strongly against weak and poor people. These people are resource less and have a very weak claim on social entitlements, became irrelevant in the social quid pro quo. These people become subject to a spiral of social exclusion, which deprives them of all the opportunities to progress on ethnic and economic grounds. Their lack of capital and entrepreneurial skills along with low credibility with community denies them the slight opportunity to move forward. Ever increasing poverty, poor health, old age, diminishing livelihoods, nominal shelter lead to extinction of these impoverished people (Mahmood, 2005). In the Northern Areas of Pakistan, poverty is relatively higher than the rest of Pakistan (56% of the national average, Abbassi and Ahmed, 2003), the poorest are suspected to have least access to the program benefits of BACIP. These people are unable to afford the relative high prices of AHITs as given in Appendix IIV.

3.1.6 Poverty and Health

A study conducted by Howard and Obika (2003) confirm that there is a close relationship between household poverty and human health. From the earliest development of development of the sanitary revolution, it has been recognized that poor households suffered the greatest health burden, leading to further poverty and hence creating a vicious cycle of poverty. The main drive for the sanitary revolution was to address the ill-health among the poor (Ahmed, 2005).

Studies in both developed and developing countries continue to point to the greater health burden carried by poor households compared to better off neighbors (Howard and Obika, 2003). In most developed countries, the cost of diseases including medical bills and loss

of wages is compensated by health insurance, employment insurance or social security, while in most developing countries no such safety measures exist and therefore, the impact of ill-health on poor households is catastrophic. All these costs and loss of income is borne by poor households whose available assets are already very limited. The medical bills always lead to relinquished expenditure on other items, some times the most important ones like food, clothes and education. Ill health not only increases expenditures but it also reduces earning power, which may have further impacts on poverty. Studies showed that when the earning members of a household are ill at times of peak work, they suffer from subsequent hardships (Howard and Obika, 2003). The Northern Areas are the poorest region of Pakistan, where the housing conditions are unsatisfactory and inadequate. The poor housing conditions lead to high incidences of disease. On average each household in the Northern Areas spend 4.5% of total disposable income on the treatment of these diseases (Sedky and Abid, 2003).

3.1.7 Poverty and Environmental Degradation

According to Asian Development Bank (ADB, 2002), the poor are also characterized by their vulnerability to environmental degradation and deterioration of the natural resource base that has a devastating impact on the poor, given that they tend to be strongly dependent on the exploitation of such resources. As population grows, and the quantity and quality of renewable resources decline, resource captures that occur in powerful groups alter the distribution of resources in their favor. Resources are in effect appropriated by the elite, increasing environmental scarcity among poorer or weaker groups as a result. Groups experiencing this scarcity are then often ecologically

marginalized as they migrate to rural or urban regions that are also ecologically fragile (ADB, 2002).

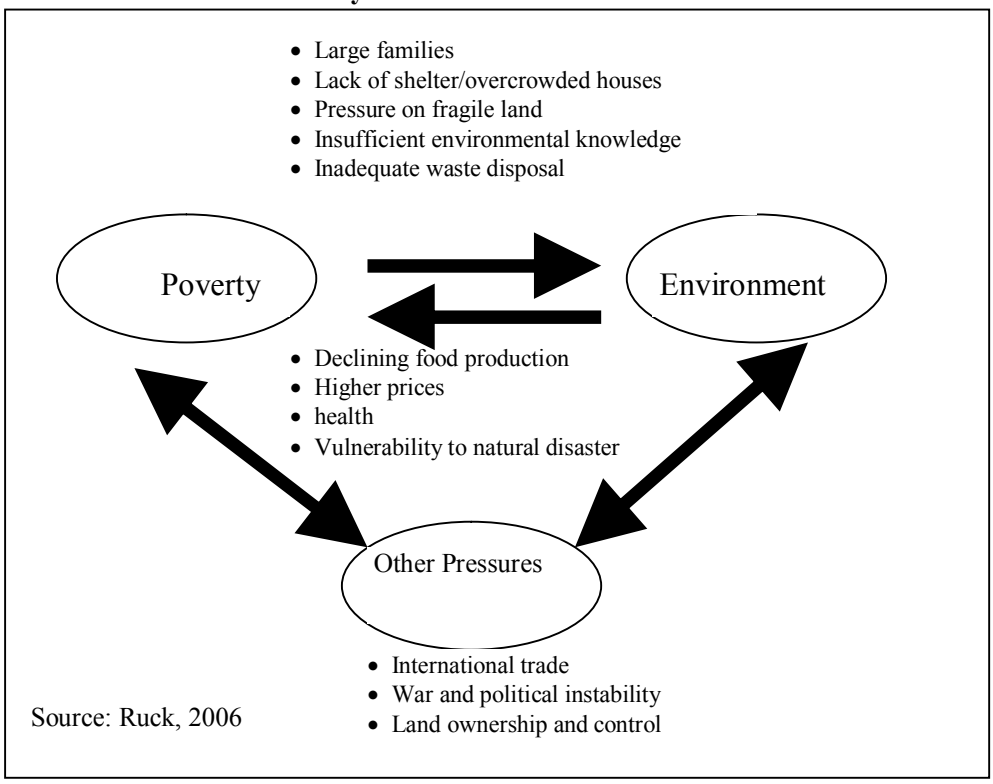
Climate change is projected to increase environmental stress in already marginal lands and to raise the frequency of natural hazards. Continued greenhouse gas emissions are likely to be associated with changes in rainfall patterns, desertification, more frequent storms and rises in sea level, all of which have implications for human movement (The Cities Alliance, 2007).

Available observational evidences indicate that regional changes in climate, particularly increases in temperature, have already affected a diverse set of physical and biological systems in many parts of the world (Climate Change 2001). Climate change impacts are found to be most severe in less developed rural communities, in the form of natural disasters like droughts and floods, which affect directly the lives and livelihoods of people. According to the International Institute for Sustainable Development – IISD (2009), climate change is a global phenomenon, nations differ both in their contribution to the problem and in their vulnerability to its impacts. Many of the countries least responsible for the growing accumulation of greenhouse gases in the Earth's atmosphere, particularly those in the developing world, are likely to be among those most heavily impacted by climate change. The prevalence of poverty and a lack of adequate public infrastructure are two elements that will work to magnify the ecological, social and economic impacts of climate change in developing countries, including Pakistan.

Changing rainfall patterns, for example, will affect the availability of water and hence the production of food, possibly increasing food prices and the risk of famine. Existing estimates indicate that several developing areas will be strongly affected by climate

change, although the range of estimates is still very wide and predictions are subject to considerable uncertainty. At one extreme, by 2020 it is expected that the yields from rain-fed agriculture in Southern Africa could be halved by drought (Dreze and Sen, 1999). Over the medium term, as glacial water banks run down, river flows are expected to diminish, severely affecting irrigated agriculture, especially around major mountainous regions including the great Himalayas, Karakuram and Hindu Kush (HDR, 2009). The study area is located in the center of these three great mountain ranges. The livelihoods of the local people are mostly dependent on agriculture. Agriculture in turn is entirely dependent on the irrigation water coming from the glaciers. Due to possible climatic changes when all these glaciers melt, then there will be no water for irrigation and no agriculture practices in the area will be possible. As a result the people of the Northern Areas will lose their major source of livelihood that will cause more deep and severe poverty in the region.

Figure 2.2: The nexus of Poverty and Environment



3.1.8 Poverty and Housing

Poverty refers to the non-fulfillment of basic needs and is commonly determined by level of income, and the asset ownership (physical and financial) of an individual or a family. Shelter comes next to food and clothing in the hierarchy of basic needs. Therefore housing occupies a special place in family living standards and can determine the level of prosperity or poverty (Asian Development Bank, 2002). According to the United Nations Housing Rights Programme (UNHRP, 2004) 100 million people are homeless around the world. The available data suggests among these 100 million people, that increasing proportions are of women and children (UNHRP, 2004). The situation of housing conditions in Pakistan is alarming. Pakistan is facing an acute shortage of housing units. According to a recent report of United Nations Human Settlements Programme (UN Habitat), there is a shortfall of more than five million housing units in Pakistan (UN Habitat, 2009).

Adequate housing is one of the effective means to alleviate poverty because shelter is usually the most expensive item for households (NUS, 2004). It is also a pre-requisite factor for better health, providing a great amount of saving when one is not sick. It is argued further that housing is a source of income because people can use their house as a place to generate income, through home-based business or through its safe location (NUS, 2004). Having seen the importance of such housing issues, a number of developing countries have accepted housing as a critical means to achieve the goals of poverty reduction of its population specially the urban poor (Meng Bunnarith, 2004).

According to ADB (2002), poverty in Pakistan is constantly increasing since its independence in 1947, except between the period of 1980 to 1988. During this period

poverty in Pakistan declined in both rural and urban areas. Multiple factors contributed in this reduction but the two major factors that helped in reducing the extreme poverty were the green revolution in the agricultural sector, and an increase in employment due to a boom in the housing and construction sectors. Based on past experiences, we can state that the sector that is most capable of stimulating growth while reducing poverty is the housing and urban development sector. It is a well-known fact that investments in housing and urban infrastructure serve are a key engine of creating jobs, stimulate economic growth and as a key means of creating household wealth. Considering the enormous backlog of affordable housing and basic infrastructure in most of the developing countries the world, investments in the housing sector will remain a major growth opportunity for many years to come (NUS, 2004).

Better housing environment is both a demand and supply side phenomena. Households experiencing a higher income/wealth may move out to better housing status, for example from one to two room houses and into better localities. On the supply side government may increase the access of economic infrastructure, for example electricity and gas for cooking purposes thus enabling households to switch to their use and thereby improve the quality of housing and living (Jamal, 2009).

According to Jamal (2009), housing structures and household assets are an important aspect of measuring poverty. A household is considered relatively poor, if the housing structure is unsatisfactory or inadequate. The housing structure is deemed unsatisfactory if un-baked bricks, earth bound materials, wood or bamboos were used predominantly in the construction of walls and roof. A housing unit is considered inadequate, if it is too congested (number of persons per room), represented by households with more than two persons per room in a house (excluding minors, six years and below). Households lacking essential

facilities including electricity, potable water, kitchens, bathrooms/toilets, and telephone facility (landline or mobile) are treated as 'poor'. The proportion of the population using different sources of energy for cooking and heating is considered an important gauge of quality of living and even an indicator for environmental degradation. According to the Household Income and Expenditure Surveys (HIES) enumerated during (2004-05), 18.23 % people are using natural gas, 11.93% using electricity and majority of the poor people (69.84%) living particularly in rural uses wood including its bye products, i.e., logging residues and thinnings etc. for heating and cooking in Pakistan. Alongside measuring consumption poverty this indicator can also be used to assess the levels of environmental degradation, as shrubs and young trees are continuously removed to keep up with the fuel needs of ever growing population. To fully capture the poverty in endowments, non-ownership of house and non-ownership of any household assets[5] can be added to the list of variables for assessing the household multidimensional poverty[6] (Anwar, 2005, Akhter, et al, 2007), and Jamal, 2009). In case of the Northern Areas, if we take individual housing units, household assets and sources of energy (for heating and cooking) as a yardstick for measuring multidimensional poverty, then the conditions become worse. According to Abbassi and Ahmed (2003), 77% of the houses in the Northern Areas are made from mud and stone masonry with wood roofs a density of 9 persons per household. Eighty two percent of households are using wood as a source of energy for cooking, while 91% of households uses as a source of energy for heating. In the absence of alternative sources of energy, only 10% of the households are using Liquefied Petroleum Gas cylinders (LPG cylinders) for

[5] These assets are; refrigerator, freezer, air-conditioner, air cooler, geyser, washing machine, camera, cooking range, heater, car, motorcycle, TV, VCR, cassette player, compact disk player, vacuum cleaner and computer.

[6] Landlessness is also an important aspect of multidimensional poverty and a powerful determinant of social exclusion in rural areas. Since the analysis was done in a national framework, it was difficult to include a characteristic associated only with rural households.

cooking, while 1% of households use LPG for heating. Only 1% of people use electricity for heating and only 2.5% use it for heating (Abbassi and Ahmed, 2003, pp.84). Similarly 59% have access to potable water, while only 23% households have proper toilet or sanitation facility[7].

According to Langendijk (1995), in the Northern Areas, traditionally settlements in the region were clustered and located on rocky or infertile land in order to preserve agricultural land and in the past, to protect against enemies. Potentially dangerous areas, because of risk of floods or avalanches, or areas without irrigation and drinking water were avoided for settlement. Due to cultural changes, people are avoiding building houses in compact clusters. Usually people prefer open agriculture fields for new construction and hence construction of buildings continuously encroach agricultural land. Due to some cultural practices and lack of technology, new houses are mostly built in linear fashion and consist of a single storey building. Encroachment on agricultural lands, is increasing poverty in the region by reducing income for agricultural activities (Lieshout, et al,1995).

3.2 Approaches to Address Poverty

3.2.1 Sustainable livelihood

The concept of sustainable livelihoods has developed over the last three decades to a place where it is widely accepted as offering insights into the dynamics of development and the diversity of experiences of poor throughout the world. It is an approach that is flexible and dynamic, provides a basis for understanding the relationship between poor communities, their local environment, and external socio-economic, environmental and institutional forces (Soussan, Piers, and Mathew, 2003).

[7] According to HIES Survey, 2004-05 a proper a tolled has a batting facility along with a pour flush latrine.

The sustainable livelihood approach (SL) is a systemic and adaptive approach that links issues of poverty reduction, sustainability and empowerment processes (e.g., participation, gender empowerment, and good governance). The attractiveness of SL lies in its applicability to different contexts, situations of uncertainty and in its capacity as a consultative and participatory process for the cross-fertilization of ideas and strategies between various stakeholders. Those living in extreme poverty and outside the formal labor market, for example, constantly improvise their livelihood strategies due to high uncertainty and limited options. According to United Nations Development Program (UNDP), sustainable livelihoods are derived from people's capacity to make a living by surviving shocks and stress and improving their material condition without jeopardizing the livelihood options of other people, either now or in the future. This requires reliance on both capabilities and assets (i.e., stores, resources, claims and accesses) for a means of living.

Singh and Titi (1994) defined sustainable livelihoods as people's capacities to generate and maintain their means of living, enhance their wellbeing and that of future generations (Singh 1996, pp.6).

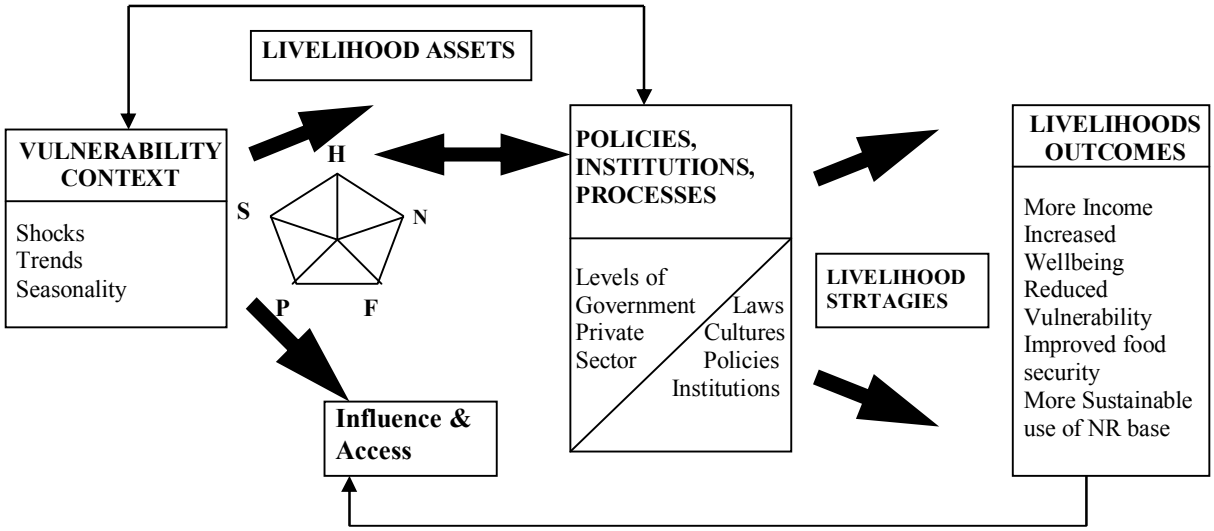
The sustainable livelihoods approach focuses on people's lives rather than on resources or defined project outputs. Poverty not only means deprivation of required income but it also includes food insecurity, social inferiority, exclusion, lack of physical assets including adequate housing, and vulnerability. Household poverty is determined by many factors, particularly access to assets and the influence of policies and institutions (Ashley, 1999).

Ashley and Carney (1999) are of the view that livelihood priorities vary; outsiders cannot assume knowledge of the objectives of a given household or group. Livelihood assessment must therefore, be based on prior understanding of local customs and traditions as well as a deep understanding of how livelihoods are constructed and which factors are the essential causes and manifestation of their poverty. The sustainable livelihoods (SL) approach to development and poverty reduction tries to take all these concerns into account. Its main aim is to promote development that is sustainable not just institutionally, but also ecologically, socially, and economically.

Chambers and Conway (1992) describe livelihood as the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both in present and also in future, while not undermining the natural resource base (Chambers and Conway, 1992).

Livelihood assessment means that changes in measurable aspects such as cash, and yield must be assessed not in terms of change in physical terms, but in terms of its contribution to livelihoods. This contribution may be direct such as increase in income, availability of more food, and better health, or it may be indirect such as affecting their assets, activities and options, and ability to cope with stress and shocks. Changes in the way people live their lives may be just as important as more obvious changes in what they achieve, both are considered within livelihoods assessment (Turton, 2000).

Figure 2.3: The Sustainable Livelihood Framework



KEY:
H = Human Capital, S = Social Capital,
N = Natural Capital, P = Physical Capital,
F = Financial Capital

Source: Caroline and Diana 1999, p.47

The overall object of the SL approach is to eliminate or reduce the incidence of poverty. Sustainable livelihood draws on many other strands of development thinking and makes use of a variety of existing methods of analysis. The SL framework is a tool to assist those using the SL approach. It helps to show how the main factors that influence livelihoods relate to each other. In the case of the Northern Areas of Pakistan, resource poverty in the region can be explained by sustainable livelihoods approach, which provides a framework to analyze and explain the resource poverty in terms of natural, physical, social and human capital.

3.2.2 Healthy Community

Wileden (1970) describe a prescription for a healthy community as:

The grass roots of the nation are found in local communities." if the community is literate, the nation is literate; if the community is economically sound, the nation is economically sound; if the community is physically, morally, and spiritually healthy, the nation is physically, morally and spiritually healthy" (Wileden, 1970, cited in Dykeman, 1987, p. 1).

Leonard (2003) described that a healthy community is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential (Leonard J. 2003).

According to the American Department of Public Health (2007), the qualities of a healthy community include:

• Clean and safe physical environment;

• Peace, equity and social justice;

• Diverse and vital economy;

• Protection of the natural environment and responsible use of resources to ensure long term sustainability;

• Adequate access to food, water, shelter, income, safety, work and recreation for all;

• Adequate access to health care services;

• Opportunities for learning and skill development;

• Strong, mutually supportive relationships and networks;

• Workplaces are supportive of individual and family well-being;

• Wide participation of residents in all level of decision-making and strong local cultural heritage potential (Leonard J. 2003).

Hancock (1999) developed a model of health and the community ecosystem (Figure 2.3). In this model Hancock tried to integrate the concept of health, environment, and economy in the context of sustainable community development. The central focus of this model is human development (Hancock, 1999).The model describes three qualities for each of the community, the environment and the economy, that should be present if human health and development is to be maximized.

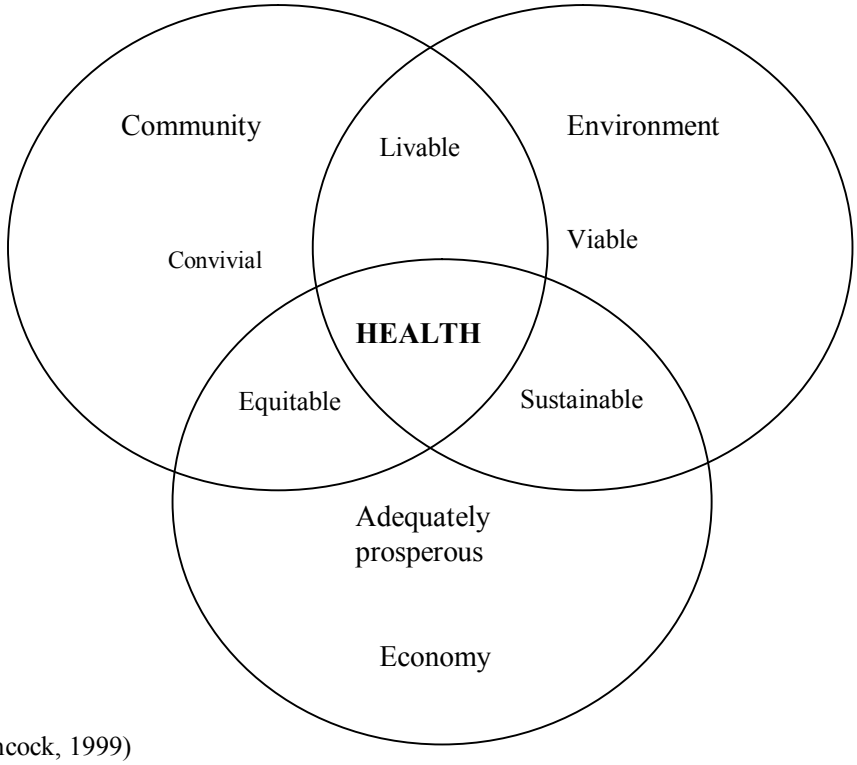
The Hancock model suggests that community itself needs to be convivial with social support networks. Its members need to live harmoniously together and participate fully in the life of their community. In addition, the built environment of the community needs to be livable. Further, the community needs to be equitable. Their members are to be treated with fairness and justice, all their basic needs are met and they have an equal opportunity to achieve their maximum potential.

In the economic sphere, the model suggests that the primary quality of the economy is that it has to be adequate and the local economy generates enough wealth to enable all its members to achieve a satisfactory level of health and well-being. In addition, to make the community socially sustainable it is necessary to equitably distribute the economic wealth among its members.

Similarly, the present model describes that like community and economy, the environment also have three basic qualities. First, the environment must be sustained over the long term, so that the great web of life in all its richness and diversity is maintained.

Secondly, it must be viable for humans, which requires suitable range of temperature, and solar radiation, clean air and water, and plants and animals to provide food. Finally, the environment must be considered not only in terms of the natural environment but the built environment, which must be live able from a community and human standpoint.

Fig. 2.4: A model of health and the community economic system



(Source: Hancock, 1999)

The Hancock model integrates in a logical way the three main components of a sustainable society; health, economy, and the environment. In the present research this model will be used to identify the impacts of impacts of AHITs on the health, economy and environment of the study area.

2.2.3 Appropriate Technology

According to Kaplinsky (1999), appropriate technology may be defined as the set of techniques, which make optimum use of available resources in a given environment. For each process or project, it is the technology, which maximizes social welfare (Kaplinsky, 1990).

Another definition of appropriate technology presented by Ashoka Khosla of Development Alternatives India is "technology which springs from indigenous creativity, in response to local needs and possibilities, and which serves the goals of development " (cited in Clarke Robin 1985, pp.90).

The US Congress Office of Technology Assessment characterizes appropriate technology as being small scale, energy efficient, environmentally sound, labour intensive, and controlled by the local community (Hazeltine et al, 1999).

According to Hazeltine and Bull (2003), appropriate technology can be defined as any object, process, ideas, or practice that enhances human fulfillment through satisfaction of human needs. A technology is deemed to be appropriate when it is compatible with local culture, and economic condition (human, material, and culture resources of the economy), and utilizes locally available material, and energy resources, with tools and process maintained and operationally controlled by the local population. Abubakar has further suggested that appropriate technology should be self sustaining, causing minimal disruption to local culture, and ensure the social welfare of the population (Hazeltine and Bull, 2003.pp3).

The Intermediate Technology Development Group (ITDG, 2007) was founded by Dr. E.P. Schumacher, a British economist in 1966. ITDG is a non-governmental organization

(NGO), working for the sustainable development of appropriate technologies around the globe, particularly in developing countries. ITDG helps to build the technical skills of poor people in developing countries. ITDG is engaged in a range of activities including research, technology development, field testing and commercialization, technical assistance, advocacy, and capacity building through training. ITDG also publishes material on appropriate technology and is one of the world's largest publishers and supplier of books and journals on appropriate technology (Hazeltine et al, 1999). ITDG believes that sustainable development is achieved only if the participants in the process are its architects and every technology is only appropriate if its users are able to continue to adapt and innovate whatever the future brings (Hazeltine and Bull (2003).

Churchill (1987) listed the characteristics of appropriate technology are:

- the technology should be appropriately fit into the social-culture norms of the local community;
- It should be affordable;
- The local artisans or skilled people should be able to maintain it;
- It must have easily understood attributes and technically efficient;
- It must use locally available material or spare parts as possible

Exploring the literature of appropriate technology (AT), there is agreement that AT should be environmentally friendly; low cost; labour intensive creating more jobs for local people; and bringing into use the local available dormant material; and maintained and operated by local people. In the real world, it may be difficult to find all these characteristics in any one technology. For example AT may utilize local material but if some of the materials required can not be found locally or locally available materials are

exhausted then the material may have to be imported to maintain the technology in use. Similarly, all AT will not be completely environmentally friendly. For Example the brick kilns in developing countries often use local raw material; are labour intensive; can be maintained and operated by local people. These kilns are not, however, environmentally friendly, as they pollute ambient air. Some critiques of AT suggest that AT keeps people 'behind' in the race of progress, because it is against the use of more advanced and complex technologies (Shah, 2004). However, in my view and following from Shah, based on particular local conditions, and in order to improve the economic and living conditions of the people in developing countries, AT may be seen as an adequate option for improving the local living conditions (Shah, 2004).

Based on the definitions and characteristics identified by Schumacher, 1973, K. Ashok, 1985, Churchill, 1987, Boasti & Sosthenes, 1998, Bull & Hazeltine, 2003, for the present research we can conclude that the appropriate technology (AT) should be simple, easy to be operated, repaired and maintained by local craft persons or artisans. It should use fully or partially utilize the resources locally available. It should provide jobs to local people. It should be economically viable, environmentally compatible, and socially acceptable.

2.2.4 Capacity Building:

Capacity-building has moved from a focus on individual training to the development of institutions, and further into complex systems thinking. Newer definitions emphasize the continuing process of strengthening ability to perform core functions, solve problems, define and achieve objectives and understand and deal with development needs (n.d).

The United Nations Center for Environment and Development has defined the term Capacity Building as:

"Specifically, Capacity Building encompasses the country's human, scientific, technological, organizational, institutional, and resource capabilities. A fundamental goal of capacity building is to enhance the ability to evaluate and address the crucial questions related to policy choices and modes of implementation among development options, based on an understanding of environment potentials and limits and of needs perceived by the people of the country concerned" (UNCED, 1992, downloaded on March 21, 2008 from http://habitat.igc.org/agenda21/ch-37.html).

The United Nation Development Program (UNDP) described capacity development is a process by which individuals, groups, organizations, institutions and societies increase their abilities to:

1) perform core functions, solve problems, define and achieve objectives; and

2) understand and deal with their development needs in a broad context and in a sustainable manner" (UNDP, 1997) .

The World Bank (WB) has described capacity development as an investment in human resource development, institutions development, and establishing good practices that together, enable individuals, regions and even countries to attain their development objectives (World Bank, 1997). Eade (1997) of Oxford Committee for Famine Relief (Oxfam)[8], described capacity building as *" an approach to development not something separate from it. It is a response to the multi-dimensional processes of change, not a set*

[8] Oxford Committee for Famine Relief (Oxfam), was founded in 1942 in United Kingdom (UK), is a non-governmental organization, working in more than hundred countries to alleviate poverty, fight against injustice through advocacy campaigns, initiating development programs and response to national emergency situation.

of discrete or pre-packaged technical interventions intended to bring about a pre-defined outcome." (Eade, 1997, pp.23).

James (1998) noted that the fundamental objective of capacity building is to enable society to use its resources in an optimum way to meet all its developmental needs. He further, outlined capacity building as being characterized by three main components: skills enhancement, both general and specific; procedural improvement; and organizational strengthening.

The Canadian International Development Agency (CIDA) has a similar approach towards capacity development. According to CIDA capacity building is a process through which individuals, groups, institutions, organizations and societies enhance their abilities to respond to the multi-dimensional processes of change, not a set of discrete or pre-packaged set of technical interventions intended to meet development challenges. Capacity Development is a systematic approach using continuous learning to improve the ability and capacity of organizations to make the most effective and efficient use of the available human and financial resources to achieve the goals of the organization in a sustainable way. CIDA's interpretation of capacity building is *"long term process of facilitating knowledge acquisition to individuals about a particular sector, so that they can get empowered and acquire appropriate skills, to successfully perform their required functions, towards improving the quality of their life"* (CIDA, 2003, pp 3).

James and Valentine (1998) are of the view that the end purpose of capacity building is development of human resources. A fundamental objective of capacity building is to enable society to use its resources in an optimum way to meet all its needs. Capacity building is characterized by three main components: skills upgrading both general and

specific; procedural improvement; organizational strengthening. The skills enhancement aspect includes general education, technical skills, on-the-job training, and professional deepening in crosscutting skills, such as construction sector, accounting, policy analysis, and information technology. The procedural improvement component refers to ill designed change or system reforms, such as introducing new budgeting or replacement of existing controls over public enterprises by greater autonomy and ex post supervision.

Organizational strengthening includes institutional development - reinforcing the capacity of an organization to use available resources efficiently and effectively (James, Valentine Udoh. 1998).

Capacity building is crucial to accomplish any development project. Capacity building has also been complementary to any capital assistance of programs either run by government or by a NGO. It is not only necessary for institutional development or enhancing productivity in the collective decision making process but it also addresses the general economic conditions of an area or special segments of the population. Housing sector in any economy plays a vital role and provides a wide range of employment opportunities (direct and indirect) to a; people both in the skilled and unskilled capacities. Besides the direct impact of the housing on the livelihoods of the people in any economy, its other dimension is its value as a training ground and source of employment (Beg, 2005).

3.2.5 Level of Human Development (HDI)

There is now wider acceptance for a broader definition of poverty that includes not only income or consumption but also a variety of social indicators including health, education, and housing. Based on the Haq's idea of human development, the United Nations

Development Program (UNDP), designed a measure of the level of human development known as Human Development Index (HDI) (Government of Karnataka, 1999).
The HDI is regarded as the most balanced measure of human-well being (Mahood, 2005).

The HDI measures the average achievements in a country in three basic dimensions of human development:

- A long and healthy life, as measured by life expectancy at birth.
- Knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrollment ratio (with one-third weight).
- A decent standard of living, as measured by GDP per capita in purchasing power parity (PPP) terms in US dollars (Cutler, J. Cleveland, 2008).

The basis for selecting the critical dimensions and indicators that makeup the human development index is the identification of the basic capabilities that the people must have to contribute to the constitution of a society. The HDI value for each country, provide a bench mark how far it has to go to attain the defined goals of life expectancy (average 85 years), access to education for all, and a decent level of income (Khusro, 1999, pp. 86-89).
The recent Human Development Report, which was published in October 2009. The present report contained HDI for 182 nations. In this report, Pakistan ranked 141st, behind most of its neighbors except Afghanistan (Iran 88th, China 92,nd India 134th, and Afghanistan 181st). This indicates that in Pakistan, the overall level of human

development is very low. There exists not only extreme poverty, but people have also very limited access to education, and health care facilities.

3.3 Summary of Literature Review

The literature review suggests that poverty is a complex and multidimensional issue (Khan, 2004). Due to its complex nature it is very hard to fully understand the causes of poverty (OECD, 2001). No single approach can be used to fully define the term and no single methodology can give perfect results to measure the degree or intensity of poverty in a particular region or context. In the case of developing countries, exploitation of natural resources, relatively unproductive human resources, lack of accessibility to financial capital, and inappropriate institutional arrangements have contributed to extreme rural poverty.

The nature of poverty varies from region to region and country to country. The causes of poverty for each region also vary but on a global scale there exist some similarities (Khan, 2004). Critical investigations are required to explore the phenomena in detail and identify some practical solution for it alleviation. The most useful approaches for this research that are identified with alleviation of poverty are: Sustainable Livelihoods (Soussan, Piers, and Mathew, 2003), Healthy Communities (Hancock, 1999), and Capacity Building (CIDA, 2003). Literature suggests that Appropriate Technology can be used as a tool to address the issue of poverty (Hazeltine and Bull, 2003).

The housing improvement technologies (HITs) introduced by Aga Khan Planning and Building Service (AKPBSP) in the Northern Areas of Pakistan will be evaluated against the parameters as described in the poverty reduction approaches including Sustainable

Livelihoods, Healthy Communities, and Capacity Building. The data collected from various sources and also from the field will be analyzed to judge the performance of these interventions in terms of poverty alleviation and environmental conservation. This attempt, as anticipated will yield a policy lesson for poverty reduction and environmental conservation endeavors of most developmental like the World Bank (WB), United Nations Development Program (UNDP), International Union for Nature Conservation (IUCN), United State Agency for International Development (USAID), Canadian International Development Agency (CIDA), and many other international, national, regional and local organizations.

CHAPTER 4: ENVIRONMENTAL SETTING OF THE STUDY AREA

4.0 Introduction

This chapter highlights salient features of the area's history, geography, climatic conditions, demographic features and the existing situation of poverty and housing in the Gilgit – Baltistan area of Pakistan. The main purpose of this chapter is to set a context for the analyses in the next chapter. The information provided in this chapter is mostly based on secondary data obtained from various organizations, both government and non-government, including the Population Census Organization of the Government of Pakistan, The Northern Areas Forest Department of the Government of Pakistan, the Meteorological Department of the Government of Pakistan, The Northern Areas Administration and the Aga Khan Rural Support Program, The Aga Khan Planning and Building Service - Pakistan, the International Union for Nature Conservation (IUCN) Northern Areas Chapter and the World Wide Fund for Nature (WWF), Pakistan the Northern Areas chapter.

4.1 Brief History of the Northern Areas of Pakistan

Till August 8, 2009, the Northern Areas is officially referred to by the Government of Pakistan as the Federally Administered Northern Areas (FANA), and governed by the Northern Area Administration. On August 9, 2009 the Government of Pakistan changed it name and now it is called Gilgit – Baltistan and will be governed by a Chief Minister (presently it is under the rule of a governor). Gilgit – Baltistan is the northernmost political entity within the Pakistani-controlled part of the former princely state of Jammu and Kashmir. Before the merger of the area into Pakistan, the area consisted of Gilgit

Agency, the states of Baltistan, Hunza and Nagar. Except for Gilgit Agency, which was under the controlled of a Political Agent, appointed directly by the British Imperial Government, the remaining were small independently ruled states. In 1974 all three states, along with Gilgit Agency, were annexed to Pakistan. Prior to annexation they were merged into a single administrative unit, known as the Northern Areas Administration. According to the constitution of Pakistan, the Northern Areas is not an integral part of Pakistan, and therefore, its inhabitants have never had any representation in the parliament of Pakistan. As far as the United Nations is concerned, the entire area of the former princely state of Jammu and Kashmir, including the Northern Areas**,** remains a disputed territory still awaiting resolution of the long-standing dispute between India and Pakistan. In 1956, the government of India, ignoring a United Nations resolution on Kashmir, unilaterally annexed the portion of the former state that was under its control. The Government of Pakistan, however, still considers the entire area as a "disputed territory" to be resolved by a plebiscite to be held at some future date, in order to determine the entire area's accession to either India or Pakistan (GoP, 1998, www.northernareas.org.pk)

4.2 Geography and Topography

The Gilgit – Baltistan, formerly the Northern Areas of Pakistan is located at the extreme north of Pakistan and geopolitically it is the most sensitive area of the entire region. The area is spread over 72,496 sq. km., approximately the same size of the North West Frontier Province of Pakistan (See Figure 4.1). To the northwest of Gilgit – Baltistan lies the Wakhan corridor of Afghanistan, which is a narrow strip of about eight kilometers

that separates the region from the central Asian state of Tajikistan. The Chinese Autonomous Region of Xinjiang is located in the northeast, while the Indian-controlled state of Jammu and Kashmir is located to the south and southeast. The Pakistani-controlled state of Azad Jammu and Kashmir lies to the south, and North-West Frontier Province of Pakistan is located to the west and south west (see Figure 4.1).

Figure.4.1 Map of Northern Areas of Pakistan

Source: AKPBSP office Gilgit, 2008

The topography of the Northern Areas is formed by three of the world's great mountain ranges, the Hindu Kush, Karakoram and Himalayas, meeting at the confluence of the Indus and Gilgit rivers in northern Pakistan. The landscape is of high mountains with steep, unstable slopes, deeply dissected by narrow valleys. The area is famous all over the world for its high peaks and large glaciers concentrated in a relatively small radius. Godwin-Austen, (popularly known as K-2) the world's second highest peak at 8,611 m

(28, 416 ft) lies in the Skardu district of Northern Areas. Other famous peaks are Nanga Parbat, 8, 138 m (26,855 ft) high, (also known as the killer mountain), and, Rakaposhi 7,788 m (25,700 ft) high. In the Northern Areas there are some 28 peaks that are over 20,000 feet above sea level. Beside the high peaks the area is also famous for its large glaciers. Some of the famous glaciers are Batora, Biafo, Baltoro and Siachin. Siachin, about 72 kilometers long is considered the largest glacier in the world outside the polar region (GoP, 2009 & 1998, IUCN, 2003 and WWF, 2003).

4.3 Climate

There is a considerable variation in the climate of the Northern Areas. The weather conditions of the area vary from region to region. In the summer season, in towns such as Gilgit and Chilas, the daytime temperature reaches 45 degree Celsius, yet is still cold at night. On the other hand, in the same season in valleys such as Astore, Khaplu, Yasin, Hunza, and Nagar, the mean maximum temperature always remains below 30 degree Celsius. Overall the climate can be classified as dry continental Mediterranean with extreme conditions, as temperatures can rise as high as 43^{o}C in summers and drop as low as -17^{o}C in winters. Geographically Pakistan lies in the Monsoon zone, receiving precipitation from the Monsoons in summer and in winter receiving precipitation from the Western Depressions. Due to the high mountain ranges, however the monsoon winds are unable to carry their moisture to the Northern Areas. The mountain ranges form a rain shadow and therefore, the Northern Areas receive very little rainfall and can be classified as cold desert, with annual rainfall on the valley floor averaging less than 180mm. In winter the Northern Areas receive significant snowfall, up to 2000mm annually, which

occurs above 4000m, leading to marked seasonal variation in rivers flow (Khan, 1992 and 2002).

4.4 Flora and Fauna

Nature has blessed the Northern Areas of Pakistan with a variety of flora and fauna. The region lies in a dry climatic zone and has thin vegetation cover. According to 2007 estimates of the Forest Department of the Government of Pakistan, the total area of forests including farm trees is 0.7 million hectares, which is only 10.5% of the total geographical area of the region (Forest Department, 2008).

In the Northern Areas, areas having an altitude of 4000 meters above sea level are generally free from vegetation cover. Mostly, forests occur between 750 to 3900 meters above sea level. Based on altitude and distribution of rainfall, the forests of the Northern Areas can be classified into the following four categories:

a. **Sub-tropical mountain forests**: Mostly these forests are found at lower elevations. These are dry broadleaved forests consisting of scattered trees of olives, *Artimisia, Dodonia and Daphne*. With raising elevations, these merge upwards with dry temperate forests.

b. **Temperate mountain forests**: These forests are the most important timber resources of the Northern Areas. The forests are mainly found at elevations between 2000 and 3300 meters above sea level. Dominant tree species include *Chilgoza, Pinus gerardiana,* Deodar *(Cedrus deodara),* Spruce *(Picea smithiana),* Kail *(Pinus wallichiana),* Fir *(Abies , webbiana) and* Juniper *(Juniperus macropoda).* They exist throughout Gilgit and Baltistan. Deodar forests occur only in the Chilas and Darel

Tangir areas. Chilgoza distribution is in Chilas, Darel and Astore Valley. Kail is dominant in the Naltar and Babusar areas.

Sub-alpine forests: The sub-alpine forests mostly found at elevations of 3300 to 3800 meters, include Kail *(Pinus wallichiana)*, Fir *(Abies webbioiana)*, Spruce *(Picea smithiana,)* with under-stories of Birch *(betula utilis)* and salix species.

Beside the natural occurring vegetation considerable efforts have been made to enhance tree coverage through plantations. Mostly these plantations have been created by local people with the support of the Forest Department of the Government of Pakistan, the Aga Khan Rural Support Program and other governmental and non-government organizations (NGOs). These organizations have planted trees along the banks of roads, water channels, wastelands and on farmlands. These plantations mainly consist of Robinia, Ailanthus, Eleagnus, Poplar and Salix species. Presently they are one of the main sources of timber and fuel wood in the region (Forest Department, 2004).

The Northern Area of Pakistan is also home to a large number of mammal and birds species. The most important mammals of the area are the endangered Markhor, Snow Leopard, Brown Bear, Himalayan Ibex, Urial Sheep, Blue Sheep, Himalayan Black Bear, Lynx and Grey Wolf. Birds of prey include the Golden Eagle, Lammergeier, Himalayan Griffon Vulture, Common Kestrel, Long-Legged Buzzard and Alpine Chough. Important game birds include the Chukar, Snowcock, Koklas Pheasant, Hill Pigeon and Snow Pigeon.

The area is rapidly losing its forest resources and there is a dire need to preserve the forest resources of the area. A study by Abbasi and Ahmed (2003) identified that every year people get 1.1 million cubic feet (0.32 million cubic meters) of wood from these

forests for timber and fuel. If the same rate of deforestation continued with next 10 to 15 years the area will lost all of its natural forest resources and a result the area will also loose most of its mammal and birds species.

4.5 Demography of the NAs

Geographically, the Northern Areas cover 72,496 square kilometers (7.04 million ha) of which only 10 percent is inhabited. This area is home to around 0.97 million people with a high annual growth rate of 2.47% (see table 4.1). The majority of the population (90%) live in rural areas, while only 10% are living in towns (in Northern Areas there are no cities as according to the 1998 census a town will be considered city if it has a population of 25000 people or more). Female population is 48% of the total (GoP, 1998).

Table 4.1 District wise distribution and density of population in the NAs in 1998

Name of District	Total Population (numbers)	Total Area (Km^2)	Gross Population density (persons per sq-km)	Net Population density (persons /Km^2 of the habitable area)
Diamer	203591	13461	15.12	151.24
Gahanche	88366	7400	11.94	119.41
Ghizer	120218	9635	12.47	124.77
Gilgit	343324	27000	12.71	127.15
Sakrdu	214848	15000	14.32	143.22
Total	970347	72496	13.4	133.84

(GoP, 2002, NEAP, 2007)

From the above table it is clear that, compared to gross population density, the net population density is very high, which is one of the contributing factors in the overall poverty condition in the area.

The total number of households in the area is around 110,785 households with an average household size of over 9 persons per household. The main reason for this high household size is the nucleated or extended family system, in which extended families live together in one house. The region has about over 1200 villages, with an average village size of 92 houses. The overall literacy rate is 42%, but is only 23% for females. Average cultivated landholding is about 1.2 acres per household, (average 9.9 people). The per capita annual income is Rs. 10,800 (US$ 140) with 32% of the population living below the nationally defined poverty level (Abbasi and Ahmed, 2002).

There are eight ethnic groups, viz; Baltis, Yashkuns, Moghal, Kashmiries, Pathans, Laddakis and Turks speaking eight different languages namely Shina, Balti, Brushiski, Khawar, Wakhi, Urdu, Pushto, and Farsi.

The state religion is Islam. The four major religious sects are Sunnies, Shias, Ismailies and Noorbukshies. Sunnies are mostly in Daimer and Gilgit districts. The majority of Shias are in Skardu and Ghanche districts. The Ismalies are mostly in Ghizer district and in the Hunza sub-division of Gilgit district (See Ethnic distribution map of Northern Area at Appendix VI).

4.6 Poverty in the Northern Areas

In the Northern Areas, 90% of the population lives in villages and hamlets dispersed along the valleys, and are engaged principally in farming, for subsistence and cash-crops. The total geographical area is more than 7 million hectares but less than 5% of the land is suitable for farming. Due to dry climatic conditions in the area, agricultural practices in the area are entirely dependent on channel irrigation. The irrigation water is diverted

along the sides of valleys, sometimes for considerable distances, from upstream rivers, streams, and springs or even from melting glaciers. In the Northern Areas, the average agriculture land holding per household is 1.2 acres. The majority of the agricultural land lies in the single cropping zone (in these areas winter season is extremely cold and crops can only grow in summer season) (for detail see table 4.2).

Table 4.2 Cropping Zones in the Northern Areas

Farming System	Altitude	Approx. Share
Double Cropping Zone	4,000 ft – 5,500 ft	42%
Transitional	5,500 ft – 7,000 ft	12%
Single Cropping Zone	7,000 ft – 11,000 ft	46%

(Source: AKRSP, 2002 PP. 77)

Important crops include maize, wheat, barley, millet, potatoes, peas and beans, fruit and nut trees. Livestock husbandry – sheep, goats, cattle and yaks – is important, with extensive grazing in valleys and high-level summer pastures.

Due to the small land holdings, high reliance on agriculture out puts and un-availability of other employment opportunities (84% of the total population is engaged in agriculture activities) the area is extremely poor. Severity of poverty is also indicated by the high dependency ratio (total number of dependent persons per earning member of a family). In the region the overall dependency ratio in 2005 was 85. The dependency ratio in the Northern Areas cannot be compared with the rest of Pakistan as for Pakistan the data is only available for 1981 and 1998 (census data, which is not comparable with the AKRSP data).

Table 4.3 Dependency Ratio in the Northern Areas for selected years

Year	1991	1997	2001
Dependency Ratio	88	84	85

(Source: AKRSP, 2002)

The high dependency ratio may be due to factors such as small landholdings, the remote and inaccessible location, limited opportunities for the development of small enterprises and businesses, and unavailability of other off-farm employment opportunities to the people of the area.

During the last two decades, upgrading of the existing road network, the development of other communication channels such as provision of national and international telephone contact, and the introduction of internet in the region enabled greater mobility of local people and provided more off-farm employment opportunities, including in trade and the public sector. In the Northern Areas, about 50% of the population still relies on agricultural outputs, as shown in the table 4.4.

Table 4.4 Share of Off-farm incomes in total incomes

Year	**Astore**	**Baltistant**	**Chitral**	**Gilgit**	**NAs**
1997	42%	47%	50%	44%	45%
2001	63%	54%	51%	62%	58%

(Source: AKRSP, 1998 and 2002)

No statistical data is available about out-migration presently; however, due to high population growth and extensive pressure on agricultural lands, a significant number of people particularly youth and adults are emigrating to other cities and overseas, especially to the Gulf States for work.

4.7 Housing Construction and Design in the Northern Areas

In the NAs due to the extreme weather conditions particularly in winter, the houses are usually constructed to minimize surface exposure to the outside environment. Generally, doors, windows, and other openings are made as small as possible to reduce heat loss. Often, they are built using a combination of mud and stone which, compared to cement, acts as a good insulator of warmth in the winter.

A typical traditional house in the Northern Areas comprises a central living area consisting of a square of about 5.5 x 5.5 meters and is divided into nine sections (See Figure 4.2). In the middle section the cooking stove or *bukhari* is placed. There are also a number of houses which do not even have a cooking stove and use an open fire in the middle of their traditional houses. The cooking stove or *bukhari* has multiple purposes as it is used for both cooking and heating and in 90% of cases wood is used as a source of fuel. In Gojal (upper Hunza) near to the China border, people also use coal and in Golakhmuli area, near to the Chitral border, people use mud with high concentrations of carbon as a source of fuel for burning in the stove (Field visit, 2008). Directly above the *bukhari* or the fireplace is a square opening in the roof that allows smoke to escape and "fresh air" to enter. Storage and cattle sheds are usually situated around the central living area. With a hole in the roof that is opened for ventilation purposes, and inadequate heating facilities, the houses are extremely cold during winter (because the heat generated is lost due to open roof hole and part of it is absorbed in the non-insulated cold walls, thus pushing the inhabitants to burn more and more fuel wood). Walls are made of mud and stone or simply with mud-blocks, which, along with mud plastered floors, create dust particles that are major pollutants of the internal atmosphere. The only source of natural

light and ventilation is usually the roof hole, the inadequacy of which results in a smoky, dust-filled, dark environment inside the house. Dampness from the walls and darkened roofs (from soot and fungus) also deteriorate the living conditions.

With the virtual disappearance of quality wood for structural reinforcement of traditionally built houses, current houses are built with lower quality wood and as such they are also of poor structural quality. They often cannot withstand grade 5 to grade 6 (Richter scale) earthquakes. The mud walls are easily damaged under the combined effect of erosion and regular minor earthquakes in the region. The roof is generally made of very heavy wooden girders which are covered with thatch and topped with a mud layer for insulation and waterproofing. This heavily loaded roof structure results in attracting significant inertia forces during earthquakes and causes significant damage because the load bearing walls are weak. They are traditionally made with mud, traditionally stabilized soil or low quality stone block masonry (Nienhuys, 2000).

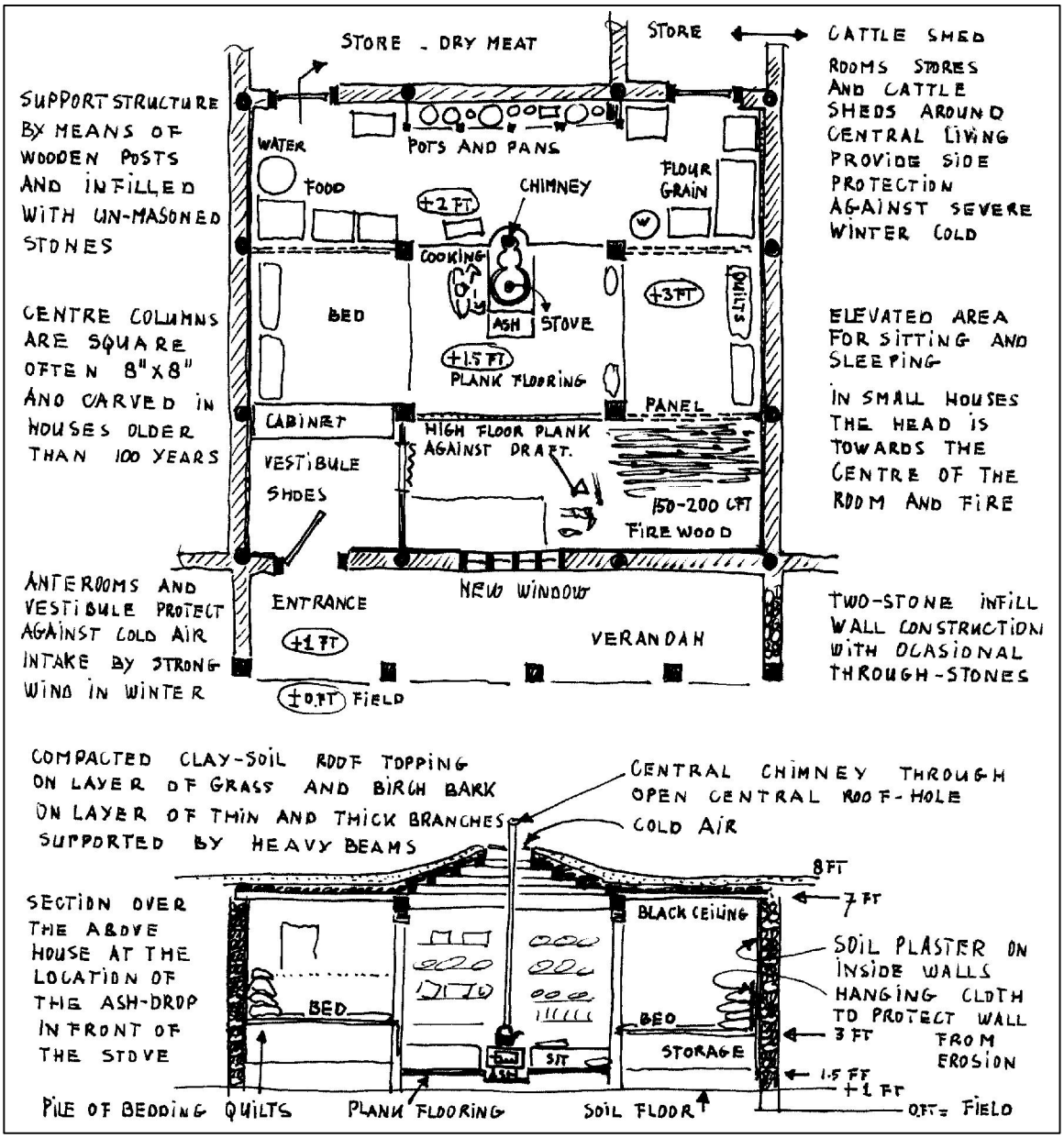
Very few houses have water supply arrangements and even fewer have hygienic sanitation facilities. Only 50% of the houses have any toilet facilities at all and people normally use cattle sheds and open fields for defecation. As a result, human wastes, particularly of children, are common sights inside or around the house. In some regions of the Northern Areas due to strict *purdah*[1] requirements, women are more likely to use the cattle sheds or wait till night-time to go out in the field for defecation.

[1] *Purdah is a cultural practice where women cover their faces with a veil and are forbidden to be seen in public*

In the Northern Areas, house repair and health-related expenses account for 5.5% and 4.5% of total disposable income respectively. The four biggest health-related problems include: 1) eye diseases; 2) acute respiratory infection; 3) pneumonia and 4) diarrhea (Sedky and Abid, 2003). These are directly related to the existing conditions inside the house, which are smoky, damp, dusty, cold and unhygienic.

There is also a serious problem with replication of construction techniques from southern cities that are unsuited to the climate which often leads to extremes in temperature between winter and summer inside the house. Due to improving road networks and the development of other communication channels, more and more people in the Northern Areas are copying construction techniques from other parts of the country without considering their local climatic conditions. When materials such as cement and steel are used in the construction of new buildings, they have a high heat transmission co-efficient. This means that the rooms rapidly cool off in cold climates and heatup quickly in summer. As a result, more energy is required for both heating and cooling (Beg, 2005).

Sketch 4.1 Plan/Section View of a Traditional House in the NAs of Pakistan



(Source: Nienhuys, 2000)

Image 4.1 An aerial view of a typical village cluster showing the traditional stone/mud construction and roof opening.

(Source: AKPBSP Image Data Bank, 2008)

In newer construction, villagers have begun to add windows to the traditional house. These new windows consist of large single glass panes that are indiscriminately oriented in any direction. The presence of large single pane glass windows is not compatible with the cold climate of this region because a considerable amount of heat escapes thorough them. As a result, the inside temperature of the houses rapidly cools down and to keep the house warm, people burn more and more fuel wood (Khan and Saeed, 2004).

Additional problems include the absence of proper drainage facilities from the houses and lack of water proofing both at the foundation level as well as at the roof. The surface water of small water channels passing alongside houses often filtrates into the ground and

is absorbed by foundation walls, causing dampness inside the house. This is even more pronounced with cement block walls and cement masonry construction.

Image 4.2: The inside of a traditional house in the NAs with open fire practice in the middle of the room

(Source: AKPBSP Image Data Bank, 2008)

With all these problems related to housing construction and existing living conditions, it is not surprising that the over all environmental health conditions in the region are also poor. Surveys have demonstrated that the largest health problems in the region include pneumonia, diarrhea, and eye disease. Forty eight percent of the total deaths of children under five in the Northern Areas and Chitral are due to diarrhea and pneumonia (AKHSP, 2003). In general, these health problems can probably be attributed in some way to conditions in and around the house. In addition, expenditures on house repair and health

account for 5.5% and 4.5% of the total disposable income respectively (Sedky and Abid, 2003).

Degradation of the built environment is an emerging issue in the Northern Areas. The degradation of the built environment is the result of a number of inter-related issues such as lack of required skills, shortfall of skilled labour, scarcity of indigenous material, and subsequent adaptation of new construction material and technologies without due consideration of local socio-economic and environmental conditions, unplanned and non-engineered housing construction, scarcity of land for the housing construction, loss of agriculture land by construction of new buildings in a linear fashion, financial constraints, non-existence of legislation and building codes; and a high population growth rate which is 2.3% according to the 1998 population census report (Beg, 2005).

The Northern Areas also face acute shortages of skilled labour particularly in the construction sector. In 2003, the Aga Khan Planning and Building Service, Pakistan (AKPBSP) conducted a study to assess the situation of the skilled labour shortage in the region. According to this study, the region was facing an almost 50% shortfall in every trade related to housing construction (for detail see, table 4.5).

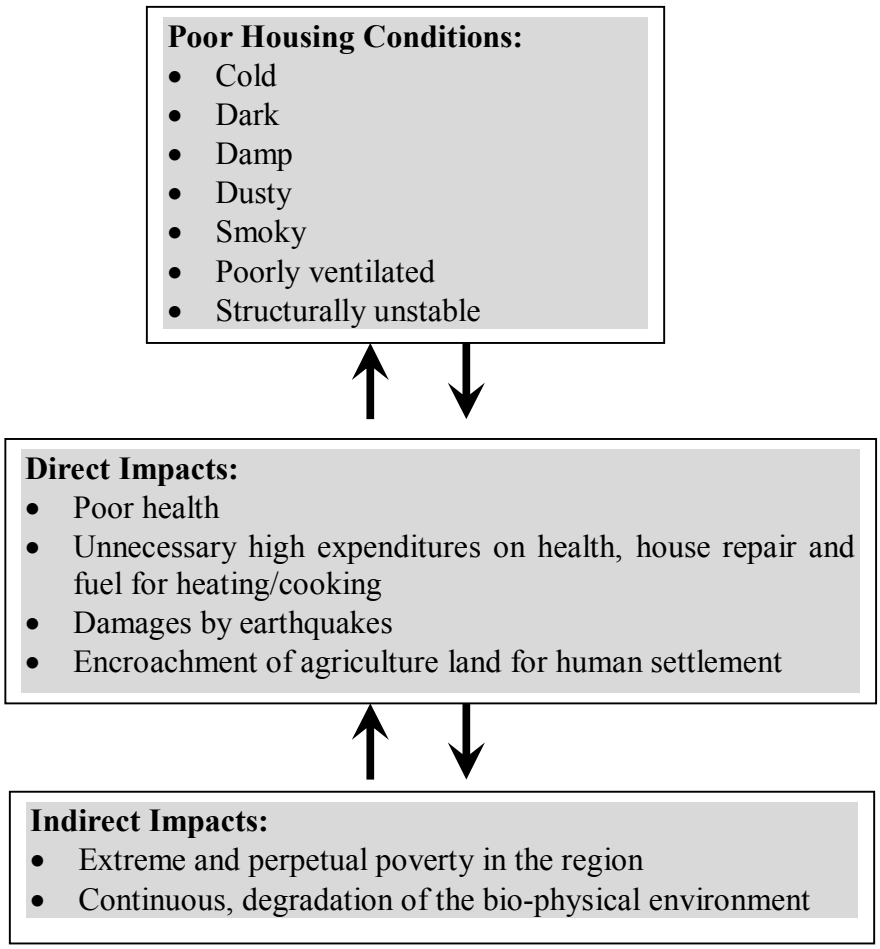
Table 4.5 Existing Situation of Skilled Manpower in the Northern Areas

Trade	Required	Existing		Shortfall	
		Nos.	%	Nos.	%
Masons	9693	4000	41.30	5693	58.70
Carpenters	5700	2700	47.36	3000	52.64
Plumbers	3846	1000	26	2846	74
Electricians	3897	2000	51.32	1897	48.68

(Source: AKPBSP, 2003. p.19)

In short, the communities in the Northern Pakistan are caught in a vicious cycle: poor housing conditions leads to ever higher expenditures, poorer health status, increased levels of poverty and unsustainable growth, while an increased level of poverty leads to worse housing conditions.

Figure 4.3: Relationship between Housing and Poverty in the NAs



(Source: Review of literature and field observation, 2008)

For all these reasons, the present study has been under taken to assess the impacts of housing improvement products developed by Building and Construction Improvement Program (BACIP) of the Aga Khan Planning and Building Service, Pakistan in the Northern Areas of Pakistan.

4.8 The Development of Appropriate Housing Improvement Technologies (AHITs)

Building and Construction Improvement Programme – BACIP is an action, research & extension project of the Aga Khan Planning and Building Service, Pakistan, an institution of the Aga Khan Development Network. The first phase of the BACIP was implemented in April 1997 by the Aga Khan Planning and Building Service, Pakistan – AKPBSP and was jointly funded by the Canadian International Development Agency – CIDA and the Aga Khan Foundation – AKF. United States Agency for International Development – USAID under its PNI-II initiative funded the programme from 2001 to 2003. In parallel, the United Nations Development Program under its Global Environment Facility – Small Grant Program (UNDP /GEF –SGP) also funded the programme during 2002 and 2003. The program has also been funded by European Union – EU and Austrian Aid (2005 to 2007) through HOPE-87, an Austrian based NGO (AKPBSP, 2007).

During the first ten years (1997 – 2007) BACIP activities included: a) research and development of products that improve the domestic environment and structural stability of houses;

b) field testing of the products for acceptability and functionality;

c) documenting the products and their manufacturing techniques;

d) promoting the products through various awareness raising and information dissemination techniques;

e) training of entrepreneurs to sell and to install the home-improvements.

Besides working on home improvement products, efforts were also made at the village level to initiate participatory cluster and village planning and the mapping of natural hazards that threaten the village population (AKPBSP, 2001).

BACIP has developed a variety of AHITs designed to enhance domestic living conditions through thermal insulations, better illumination, and ventilation and space organization. These products complement fuel wood and forest conservation practices and reduce smoke emissions to the environment. These improvements are designed to directly improve the quality of life of women and children by, reducing the time and effort required to carry out household chores, and facilitating a more comfortable, healthy and productive environment.

BACIP AHITs:

a) Roof Hatch Window: The roof hatch window is designed to cover the open roof hole in the traditional houses. It increases the light level in the house and has excellent heat conservation properties thus saving a good amount of fuel wood;

b) Fuel Efficient Cooking Stove: BACIP has designed cooking stoves that are enhanced with chimney pipe and a wind fan (called Feri – Feri) that stops back draft, hence improving smoke control;

c) Saw Dust Heating Stove: Saw dust is used in this stove as fuel. It helps in reducing fuel charges and keeps homes warmer and smoke free as smoke is drawn from the room with the help of attached chimney pipe;

d) Water Warming Geyser: BACIP has turned the traditional cooking stove in to a water warming Geyser which provides warm water without using extra fuel wood hence one can cook food, bake bread and can get warm water at the same time;

e) Solar Water Heater: BACIP designed a solar water heater to use sunlight to heat water, available at affordable price to local residents;

f) Solar Cooker: The Solar Cooker uses sun light for cooking and heating food so that meals can easily be cooked in two hours time on a sunny day without using any fuel wood; and

g) Wall Insulation Techniques: BACIP has designed various types of wall insulation techniques that insulate the walls of houses against the cold weather of the Northern Areas.

CHAPTER 5: DATA ANALYSIS AND RESEARCH FINDINGS

5.0 Introduction

This chapter describes the main findings of the research study. The overall goal of the study was to determine the impacts of Appropriate Housing Improvement Technologies (AHITs) on local residents and to assess if these impacts play a role in alleviating poverty in the region.

5.1 Socio-economic Profile of the Respondents

In terms of its total geographical area (74200 Km^2), the Northern Areas pf Pakistan has a low population density and villages are not very large in terms of population. There is a general trend of extended families in the region, due to which the average household size in the four surveyed valleys of Yasin, Ishkoman, Gilgit, and Hunza Gojal was 8.6 persons per household, with a larger household size in Yasin valley (9.6), followed by Ishkoman valley (9.2), while in Gilgit it was 8.2 and in Hunza Gojal valley it was 7.3 comparatively low (see table 5.1).

Table 5.1: Household size of the respondent households in the Study Area

S. No	Name of Valley (District)	Number of Houses Surveyed	Population	Household Size
1	Gilgit (Gilgit)	60	492	8.2
2	Hunza-Gojal (Gilgit)	60	438	7.3
3	Ishkoman (Ghizer)	60	552	9.2
4	Yasin (Ghizer)	60	576	9.6
Total		240	2058	8.6

Source: Field Survey, 2008

In terms of the male to female ratio, there was a slight difference between the male-female distributions amongst the surveyed household as there were 1074 (52.2%) males and 984 (48.8%) female members as given in table 5.2.

Table 5.2: Age wise distribution of the members of the Sample Households

Age Group (Years)	Male		Female	
	Nos.	%age	Nos.	%age
0-5	177	8.6	152	7.4
6-18	212	10.3	200	9.7
19-35	313	15.2	284	13.8
36-50	235	11.4	197	9.6
51-60	99	4.8	107	5.2
61+	39	1.9	43	2.1
Total	1075	52.2	983	48.8

Source: Field Survey, 2008

Table 5.2 shows that significant proportions (36%) of the household members were in the younger age groups of either 18 or below, the second age bracket (19 to 35 years) constitute 29% of the total sample population.

Table 5.2 shows that 65% of the members of the surveyed households were aged 35years or less, while only 35% people are above 35years. Further, the data indicate that only 1.9% are in the uppermost age group (61+years), which is an indicator of the low average life expectancy in the region. There may be several reasons for the high ratio of younger people such as high population growth rate of the study area and a cultural practice of early marriage of young children, particularly of the female members of the household. This can be validated from the fact that about 39% of household members of the house surveyed were married.

To know about the education level of the respondents, a question regarding the education status of the respondents was also included in the questionnaire, the results of which are given in Table 5.3. Table 5.3 shows that a major percentage (33.7%) of the surveyed

population had no formal education. It further, shows that as education level of respondents increases the percentage of respondents' decreases, with 24.2% at primary level and only 9.6 percent respondents were either graduated or above. The data further shows that education level of respondents living in Hunza is higher from the rest of the three valleys even from Gilgit which is center of the Northern Areas.

Table 5.3: Respondents by Level of Education

Level of Education	Gilgit		Hunza - Gojal		Ishkoman		Yasin		Total	
	Nos	%age	Nos	%age	Nos	%age	Nos	%age	Nos	%age
No Formal Education	11	18.3	19	31.6	24	40	27	45	81	33.7
Primary	20	33.3	17	28.3	12	20	9	15	58	24.2
High School	16	26.7	12	20	7	11.7	5	8.3	40	16.7
Higher Secondary	4	6.7	5	8.3	13	21.6	16	26.7	38	15.8
Graduate and above	9	15	7	11.7	4	6.7	3	5	23	9.6
Total	60	100%	60	100%	60	100%	60	100%	240	100%

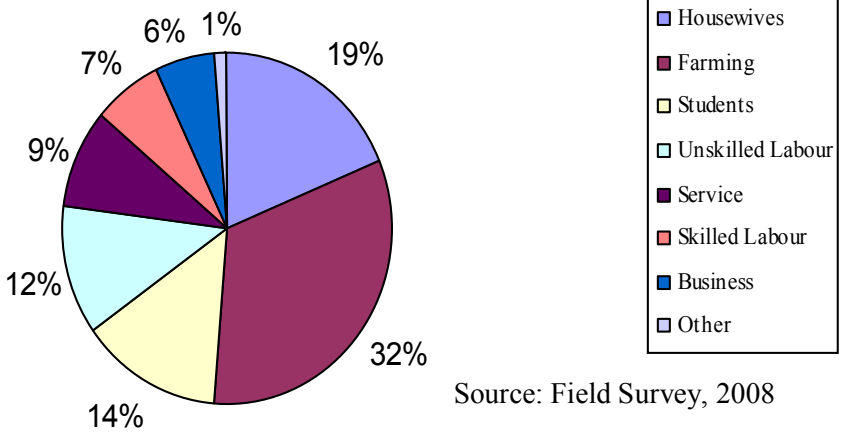
Source: Field Survey, 2008

5.2 Sources of Livelihood

Figure 5.1 represents the types of occupation of respondents. According to the surveys 32% of respondents were engaged in agricultural activities, followed by housewives at 19%. In the Northern Areas women are not only responsible for the day to day housing chores but they are also fully engaged in agricultural activities. If we add this figure to the agricultural sector, then we can assume that as a whole 46% of respondents were engaged in agricultural activates. Fourteen percent of the respondents were students. Due to limited job opportunities both for skilled and unskilled labour, only 7% of respondents were engaged in skilled labour, while 12% were engaged in unskilled labour. The low

number of skilled laborers indicates the shortage of skilled labour in the study area. Only 6% of respondents were running their own business, while 9% of respondents were belonging to service sector[9]. In the study area, the service sector is considered the most respected and a source of high income for families.

Figure 5.1: Respondents by Type of Occupation



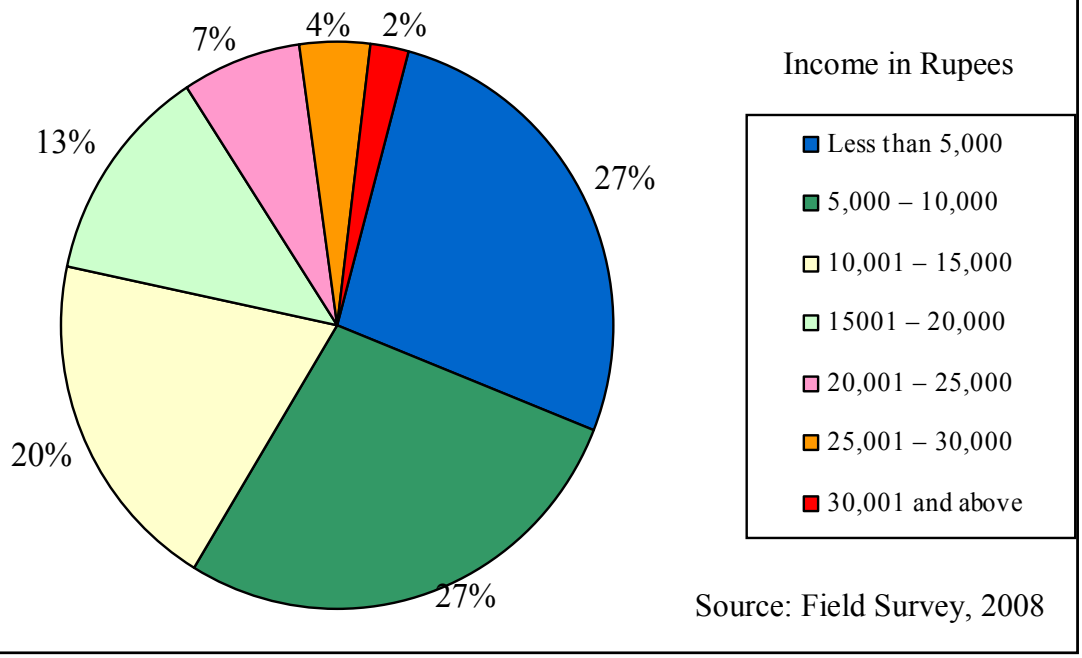
Source: Field Survey, 2008

As discussed earlier, education level of the people of the study area is very low. About 58% of the respondents were either totally non-educated or having very basic primary education up-to grade five (table 5.3). Due to low levels of education, these people are unable to get any meaningful or steady waged employment. As a result there was no specific pattern of monthly income among our respondents. In the study area, only very small portions (9%) of the population were engaged in the service sector with fixed monthly income. According to the survey 32% of people were engaged in agricultural activities. These people do not have regular income. They get some cash by selling their surplus produce. They do not keep records of their spending (inputs both cash and labour)

[9] The Northern Area is one of the poorest regions of Pakistan; therefore, opportunities for both business and service sector are limited and very limited people are engaged in business and service sector.

on agricultural production; therefore, it becomes impossible to determine net income from their agriculture activities. In agriculturally based communities due to non-availability of information, income is considered one of the most difficult variables to study. Furthermore, people are generally hesitant in providing correct information regarding their incomes. Therefore, income levels given in this survey can not be considered to be exact, but are rather indicative of the average monthly cash income per household as given in table 5.4. According to table 5.4 27% of surveyed household have monthly income of less than Pak Rs. 5000 (US$62.5). Another 27.5% of surveyed households have monthly incomes up-to Rs. 10,000; 19.5% of surveyed households have income between Rs.10,000 and Rs.15,000, 12.5% of households have monthly incomes up to Rs.20,000, and only 2.1% of households have monthly incomes above 30,000 (for detail see Figure 5.2 and Table 5.4).

Figure 5.2: Income Level of the Respondent's



Source: Field Survey, 2008

Table 5.4: Average Monthly Income of the Respondents' Households in the Study Area

Monthly Income	Gilgit		Hunza - Gojal		Ishkoman		Yasin		Total	
	Nos	%age	Nos	%age	Nos	%age	Nos	%age	Nos	%age
Less than 5000	7	11.7	13	21.7	21	35	24	40	65	27
5000 – 10,000	12	20	18	30	17	28.3	19	31.7	66	27.5
10,001 – 15,000	16	26.7	12	20	10	16.7	9	15	47	19.6
15001 – 20,000	11	18.3	7	11.7	7	11.7	5	8.3	30	12.5
20,001 – 25,000	6	10	5	8.3	3	5	3	5	17	7.1
25,001 – 30,000	5	8.3	3	5	2	3.3	0	0	10	4.2
30,001 and above	3	5	2	3.3	0	0	0	0	5	2.1
Total	60	100%	60	100%	60	100%	60	100%	240	100

Source: Field Survey, 2008

From Table 5.4 it is clear Yasin valley is the poorest valley among the four surveyed valleys of the Northern Areas, where 40% of surveyed households have a monthly income of less than Rs.5,000; while in the case of Gilgit only 11.7% of surveyed households has monthly income less than Rs.5,000. Further, in Gilgit, 10% of surveyed households have monthly income of 25,000; 8.3% have monthly incomes of up to Rs.30,000 and 5% of respondent households have monthly income of above Rs.30,000. In Yasin, 5% of respondents have monthly incomes between Rs.20,000 & 25,000 while no one has monthly income above Rs.25,000. This reflects the very poor status of the surveyed households in Yasin valley.

Incomes levels provide information about one aspect of the picture. To have full information about levels of poverty it was necessary to know the expenditure patterns of the respondents. According to the field survey, the majority of the respondents (72.1%) said that their yearly spending always exceeds than their annual income; 15.8% were of the view that they can hardly meet their needs with their income; and only 12.1% of respondents reported that they earn more than their expenses (see Figure 5.3).

The people in the Northern Areas practice subsistence agriculture. Most of what is produced is grown for personal consumption. People also spend the highest amount (47%) of their income on buying food items, followed by money spent on their children's education (23%), buying fuel wood for heating and cooking (12%), health account for 9%, travel 4% and other miscellaneous expenses account for 5% of the total family income.

5.3 Housing Infrastructure and Basic Facilities

People in the Northern Areas of Pakistan generally built their houses keeping in view their social and cultural practices, local environmental conditions and topographic constraints of their area. Along with these three major socio-physical aspects, the economic aspects also contribute significantly in selecting type of construction. The majority of the local population does not have adequate cash flow and is dependent on either subsistence agriculture or a hand to mouth income. To reduce the cost of construction, mostly locally available construction material such as wood, mud and stones is commonly used in the construction of houses. Mostly, the design work of the house is done by family members with the consultation of local masons. The unskilled labour work is also performed by the family members including women and children (Khan and Saeed, 2005). Table 5.4 confirms that the majority of houses were built from three local materials (mud, stones and wood). There are slight differences in the data for the four valleys. With Gilgit indicating a higher percentage of using non-local materials like cement, Reinforced Cement Concrete (RCC), Cement Concrete (CC) blocks, and Galvanized Iron (GI) sheet. In Gilgit, the use of mud in the construction of houses is not

very common, while on the other hand mud is a significant source of construction material in both Yasin and Ishkoman Valleys as shown in table 5.5.

Table 5.5: Construction Material of the Housing Units in the Study Area

Type	Material used	Gilgit		Hunza - Gojal		Ishkoman		Yasin		Total cases	
		#	%	#	%	#	%	#	%	#	%
Walls	Stone and cement	15	25	14	23.3	7	11.7	0	0	36	15
	Stone and mud	13	21.7	35	58.3	37	61.7	31	51.7	116	48.3
	Stone, mud and cement	11	18.3	4	6.7	3	5	1	1.6	19	7.9
	Mud blocks	0	0	0	0	11	18.3	28	46.7	39	16.3
	CC block	21	35	7	11.7	2	3.3	0	0	30	1.2.5
Roof	Wood and Mud	39	65	47	78.3	57	95	59	98.3	202	84.2
	Wood and GI Sheet	13	21.7	10	16.7	3	5	1	1.7	27	11.2
	RCC	8	13.3	3	5	0	0	0	0	11	4.6
Floor	Mud	6	10	15	25	27	45	36	60	84	35
	Mud and Wood	11	18.3	19	31.7	18	30	16	26.7	64	26.7
	Mud and Cement	9	15	14	23.3	7	11.7	6	10	36	15
	Cement and wood	8	13.3	7	11.7	5	8.3	2	3.3	22	9.2
	Cement	26	43.4	5	8.3	3	5	0	0	34	14.1
Total Cases		60	100	60	100	60	100	60	100	240	100

Source: Field Survey, 2008

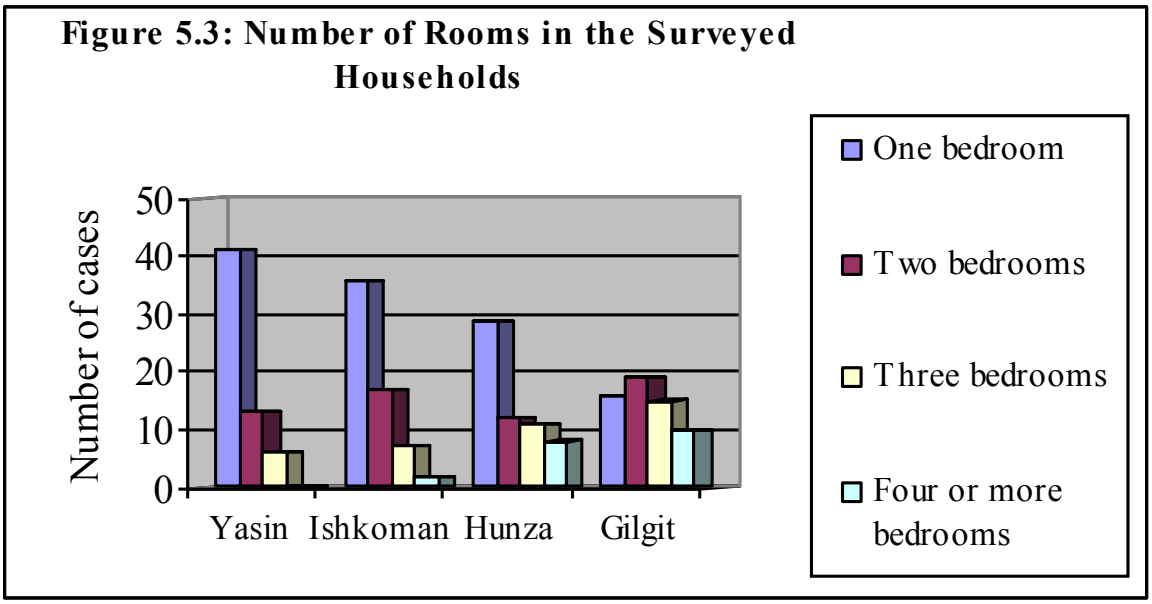
In study area many households do not have separate kitchen areas as they cook, sleep, and live in the central traditional house. In Yasin and Ishkoman valleys, this seems to be a common practice. In the four surveyed valleys, more than 75% of the respondents' are living in houses having only one or two bedrooms (traditional house or traditional house plus one extra bedroom) with an average family size of 8.6 persons. The extra high occupancy status reflects the poor economic status of the region. Among the four valleys the worst conditions prevails in Yasin valley, where 68.3% houses consist of a single

traditional room without any extension and average 9.6 persons per household (for detail see Table 5.6 & Figure 5.3).

Table 5.6: Houses type by number of Bedrooms

Type of House	Yasin		Ishkoman		Hunza-Gojal		Gilgit		Total	
	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%
One Bedroom (single traditional house)	41	68.3	36	60	29	48.3	16	26.7	122	50.8
Two bedrooms (traditional house + one extra room)	13	21.7	15	25	12	20	19	31.7	59	24.6
Three bedrooms (traditional house + two rooms)	6	10	7	11.7	11	18.3	15	25	39	16.3
Four or more bedrooms (traditional house + three or more extra rooms)	0	0	2	3.3	8	13.3	10	16.6	20	8.3
Total	60	100	60	100	60	99.9	60	100	240	100

Source: Field Survey, 2008

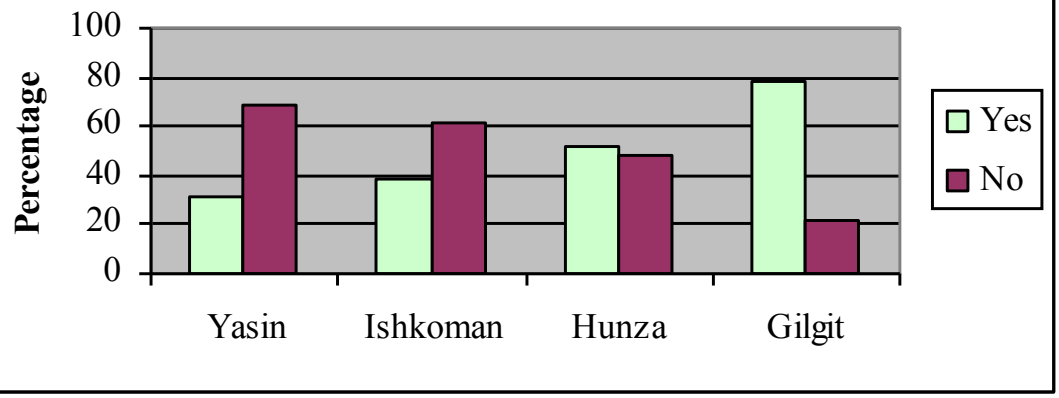


Source: Field Survey, 2008

Another important element of the housing infrastructure in the study area is the availability of a separate kitchen. The presence of a separate kitchen is an important

indicator for measuring the economic status of a household. It is a general tendency in the Northern Areas of Pakistan for prosperous people to build a separate kitchen. In winter, people use the traditional house for cooking activities while in summer people having a separate kitchen use it for cooking. Households without a separate kitchen, cook their food outside in open places in their house. Figure 5.4 shows the availability of separate kitchens in the four surveyed valleys. It is clear from the figure that Gilgit valley is relatively prosperous where about 80% surveyed households have separate kitchens, while Yasin is relatively poor, with about 70% of houses being without separate kitchen facilities. In the Hunza valley, 51% and in Iskoman valley, 40% of surveyed households have separate kitchen (Please refer to Figure 5.4).

Figure 5.4: Percentage of Houses with Separate Kitchens



Source: Field Survey, 2008

5.4 Sources of Energy in the Study Area

Fuel wood is the most common and widely used source of energy in the study area, with 100 percent of households using wood in all four valleys. The reason for the high demand for fuel wood is that, the Northern Areas are located far away from the main commercial

centers of Pakistan. The distance on the Karakoram Highway (KKH) which links the Northern Areas with nearest major two cities of Islamabad & Rawalpindi is about 1000 kilometers. The average travelling time for trucks and other goods transport on KKH is around 36 hours. The journey involves a tiring route through the mountains along with a high risk of roads blocked by landslide, rock falls and mud flow due to which the transportation cost on KKH for moving goods is extremely high. As a result, energy sources like (Liquefied Petroleum Gas) LPG gas cylinders, kerosene oil and coal are not only expensive, but mostly they are unavailable. Due to cost constraints and the undependable nature of other sources of energy, people use wood.

Image 5.1 In the Northern Areas of Pakistan, collection of fuel wood is a joint responsibility of all family members.

Source: AKPBSP Image Data Bank, 2008

The study revealed that in Gilgit Valley, beside wood, the majority (81.7%) of people were also using other sources of energy such as LPG cylinders, kerosene oil, and electricity for heating and cooking. The reason for using multiple sources of energy in Gilgit Valley is that as compared to other three valleys, Gilgit is easily accessible by road network. People in Gilgit Valley are relatively rich and can afford to make these purchases. In Case of Yasin Valley, which is the most inaccessible and relatively poor

region of the study area, where 28.3% people were using multiple sources of energy for heating and cooking (for detail see table 5.6).

Table 5.6: Main Sources of Energy in the Study Area

Type of House	Gilgit		Hunza-Gojal		Ishkoman		Yasin		Total	
	#	%	#	%	#	%	#	%	#	%
Wood	60	100	60	100	60	100	60	100	240	100
Gas Cylinder	23	38.3	11	18.3	7	11.7	5	8.3	51	21.2
Kerosene Oil	19	31.7	9	15	5	8.3	3	5	39	16.3
Electricity	7	11.7	2	3.3	0	0	0	0	9	3.75
Coal	0	0	6	10	7	11.7	9	15	6	2.5

Source: Field Survey, 2008

Although wood was the main source of energy for heating and cooking, most of the respondents were unable to provide an accurate annual cost for wood is bought from the local market. Table 5.7 shows the average amount of fuel wood consumed and its estimated cost in the four surveyed valleys before the introduction of the BACIP's Appropriate Housing Improvement Technologies. Analysis of the data revealed that in winter season, in Yasin Valley the consumption of fuel wood was higher than in the rest of other three valleys. In Yasin Valley in winter season,[10] the average consumption of fuel wood per household was about 4500 Kilogram, while the cost of 4000 Kilogram of fuel-wood in the Yasin Valley was Rs.22,500(cost wood in Yasin Valley was Rs.250 per 50Kg). In the Ishkoman Valley each surveyed household consumes 3750 Kg fuel wood per winter season worth Rs.16,500 and in the Hunza Valleys the average consumption was 3200 Kg per house hold worth Rs.14,080. The average cost of wood in these two valleys was Rs. 220 per 50 Kg. In the Gilgit Valley not only the consumption of fuel wood is relatively less but the price of fuel wood is also low as compared to other three

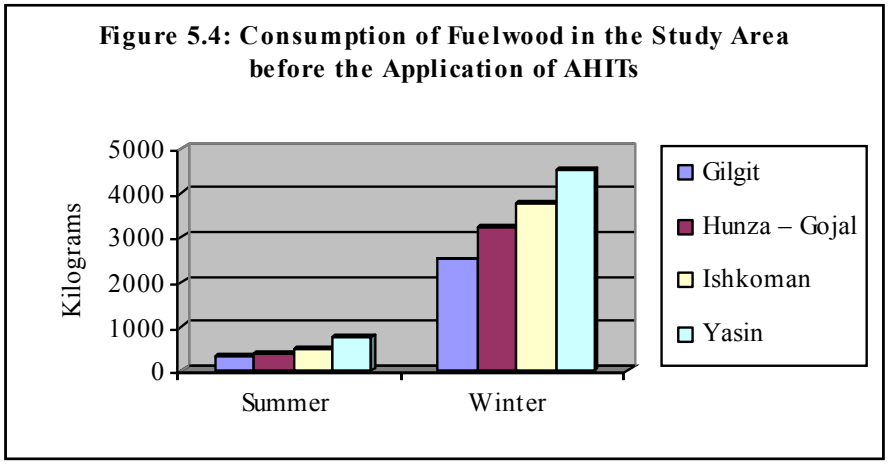
[10] From 1st November till 30th March

valleys. In the Gilgit Valley each surveyed household consume about 2500 Kg and the cost of wood in the Gilgit Valley is Rs.200 per 50 Kg. The reason for high consumption of fuel wood in the Yasin Valley is that geographically, the Yasin Valley is situated at a higher altitude and as a result the winter weather conditions are harsh. Further, due to non-availability of other energy sources, people are entirely dependent on fuel wood and consume more fuel wood as compared to other areas (For details please refer to Table 5.7 and Figure 5.4).

Table 5.7: Consumption of Fuel Wood Prior to the Introduction of AHITs

Season	Gilgit		Hunza – Gojal		Ishkoman		Yasin	
	Weight (Kg)	Price (Rs.)	Weight (Kg)	Price (Rs.)	Weight (Kg)	Price (Rs.)	Weight (Kg)	Price (Rs.)
Winter	2500	10,000	3200	14080	3750	16500	4500	22500
Summer	350	1400	400	1760	500	2200	750	3750
Total	2850	11,400	3600	15840	4250	18,700	5250	26250

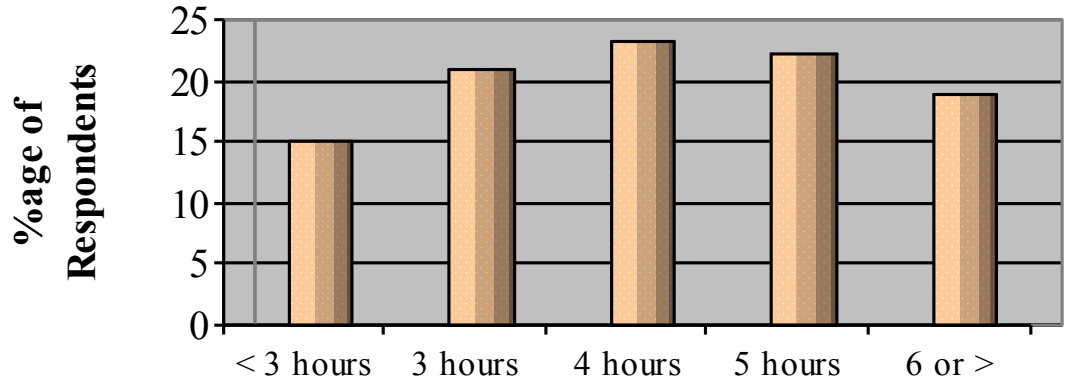
Source: Field Survey, 2008



Source: Field Survey, 2008

People of the study area not only buy fuel wood from their local markets but they also collect fuel wood from farmlands and communal forests. Particularly, in Yasin and Ishkoman Valleys, 70% of people collect fuel wood from communal forests located about at a distance of 20 to 25 kilometers. The rest of the people collect fuel wood from farmlands. Usually the collection of wood starts in late August or early September and on average it takes a whole month to collect wood sufficient for the entire winter season. In Gilgit and Hunza valleys there are no communal forests. People usually collect fuel wood from their farmlands, or buy it from the local market. Beside collection, chopping of fuel wood is also a tedious and time-consuming activity. Analysis of data indicates that each family spent a significant amount of time on wood chopping. Table 5.8 shows that majority (50%), of the households were spending 4 to 5 hours daily on wood chopping in the study area. Valley wise, in Gilgit Valley each household spend about 3.6 hours, in Hunza Valley the average time is 4 hours, in Ishkoman it is 4.5 hours and in Yasin Valley each family spend about 5 hours daily on wood chopping (see Figure 5.5 and Table 5.8).

Figure 5.5: Average Time Spent on the Collection and Chopping of Fuel Wood



Source: Field Survey, 2008

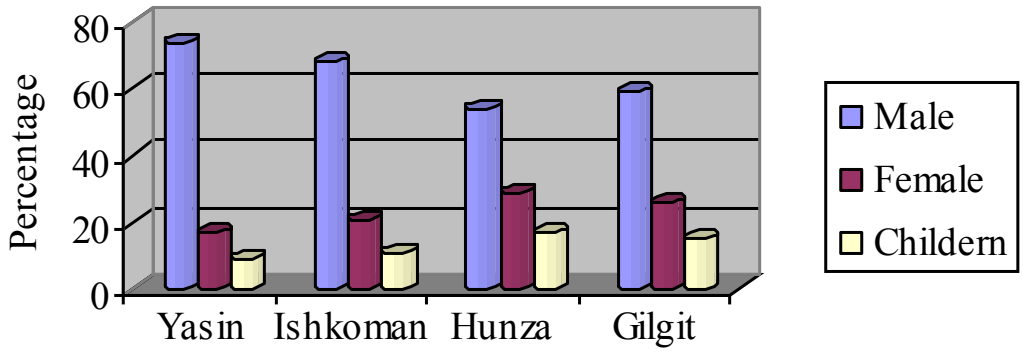
Table 5.8: Average Daily Time Spent on Collection and Chopping of Fuel Wood in the Study Area Prior to AHITs

Number of Hours	Gilgit		Hunza-Gojal		Ishkoman		Yasin		Total	
	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%
Less than 3	18	30	11	18.3	5	8.33	2	3.3	36	15
3 hours	17	28.3	15	25	10	16.7	8	13.3	50	20.8
4 hours	14	23.4	14	26.7	13	21.7	15	25	56	23.3
5 hours	8	13.3	13	21.7	15	25	17	28.33	53	22.1
6 or more hours	3	5	7	11.6	17	28.3	18	30	45	18.8

Source: Field Survey, 2008

The collection and chopping of wood is the collective responsibility of all the family members of the household but mostly it is done by male members of the household. Figure 5.5 shows the collection and chopping of wood by various family members.

Figure 5.5: Fuel Wood Collection and Chopping Responsibilty



Source: Field Survey, 2008

It is clear from the Figure 5.5 that mostly adult male family members collect and chop fuel wood, followed by females and lastly children. Household female members and

children play a more significant role in wood collection in Hunza Valley as compared to the rest of the study area. In Hunza Valley 29% of female and 17% of children share the burden of fuel wood collection and chopping.

5.6 Impacts of Appropriate Housing Improvement Technologies (AHITs)

The analysis of the field data (questionnaires and focus group discussions) revealed that the Appropriate Housing Improvement Technologies (AHITs) have multiple impacts on the socio-economic and environmental conditions of the study area. The impacts can broadly be divided into three areas, which are economic, social and environmental. These benefits are discussed in detail in the following paragraphs.

5.6.1 Economic Benefits

The study revealed that multiple types of economic benefits are associated with AHITs which include:

i. Saving through reduction in expenditures on buying fuel wood;
ii. Reduction in cold and smoke related diseases leading to saving in medical bills;
iii. Reduction in workload on the female members provide income opportunities to the female members; and
iv. More income opportunities for the BACIP trained artisans and sales persons involved in manufacturing and marketing of AHITs.

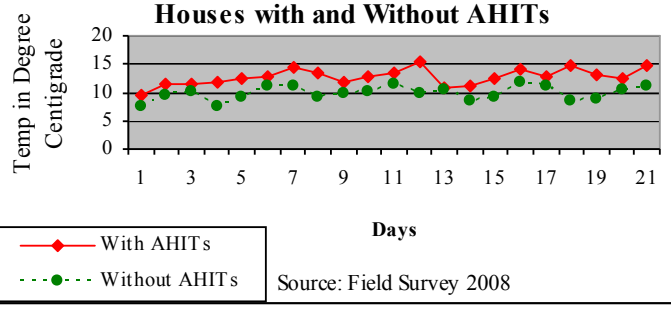
5.6.1.1 Impacts of AHITs on Fuel Wood Consumption

As discussed earlier, in the study area fuel wood is the primary source of energy for cooking and heating particularly in winter. During the field survey questions were asked from the respondents the impacts of individual AHIT on the consumption of fuel wood before and after the installation of each individual AHIT and their responses were recorded. To check the authenticity of these responses, these were cross checked with the focus group discussion. The analysis of the data (questionnaires and focus group discussions) revealed that the AHITs have significant impacts on the consumption of fuel wood. Further, the study shows that the savings of fuel wood depends on the number and nature of intervention installed. Figure 5.7 shows the impact of some selected AHITs

Case Study 1

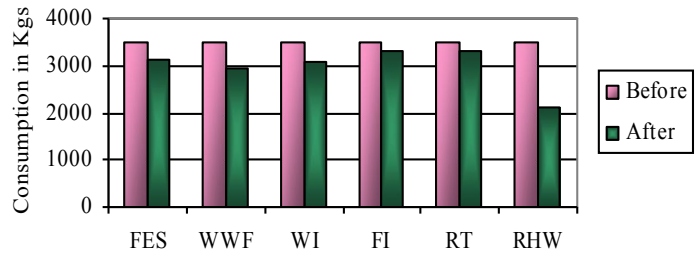
To determine the impact of AHITs on fuel wood saving and condition of warmth inside the house, two houses with nearly identical socio-economic conditions were selected. In one house there were three AHITs i.e Roof Hatch Window, Fuel Efficient Stove and Floor Insulation, while in the other house there was no AHIT. To residents of both houses spring balances and thermometers were provided to measure the consumption of fuel wood and record maximum and minimum temperature inside the house. The heating pattern for both houses was also almost identical. In both the houses heating was done from 6.30AM till 10:00PM. After three weeks (January 1 to 21) the wood consumption and temperature data for both the houses was compared. The results indicate that the house with AHITs consumed 60% less fuel wood and even then the temperature data indicates that during this period the house with AHITs was warmer than the non-BACIP house (see Figure A).

Figure A: Mean Daily Temperature Inside of Houses with and Without AHITs



Source: Field Survey 2008

Figure 5.6: Impact of Selected AHITs on Fuel Wood Consumptiomn



on wood consumption on individual households. While table 5.10 and Figure 5.8 represent the cumulative impacts of multiple interventions. Figure 5.7 shows that only the Roof Hatch Window (RHW) has a significant impact on fuel wood saving. It saves up to 40% of the fuel wood, while the individual impact of other interventions were not so significant, it ranges from 5% (Fuel Efficient Stove) to 15% (Wall Insulation).

It is clear from Figure 5.7 and Table 5.9 that the over all impacts of AHITs on fuel wood saving were significant and people in the four surveyed areas were saving significant amounts of fuel wood. In the Gilgit Valley people were saving about 60% of their fuel wood, in Hunza valley the saving are 56%, in Ishkoman valley it is 54% and in Yasin Valley people are saving upto 50% of their Fuel wood. The analysis of the data shows that the savings in fuel wood depend on the climatic conditions of the area and the number of products installed. The study further suggested that each year with the help of AHITs the 240 surveyed households

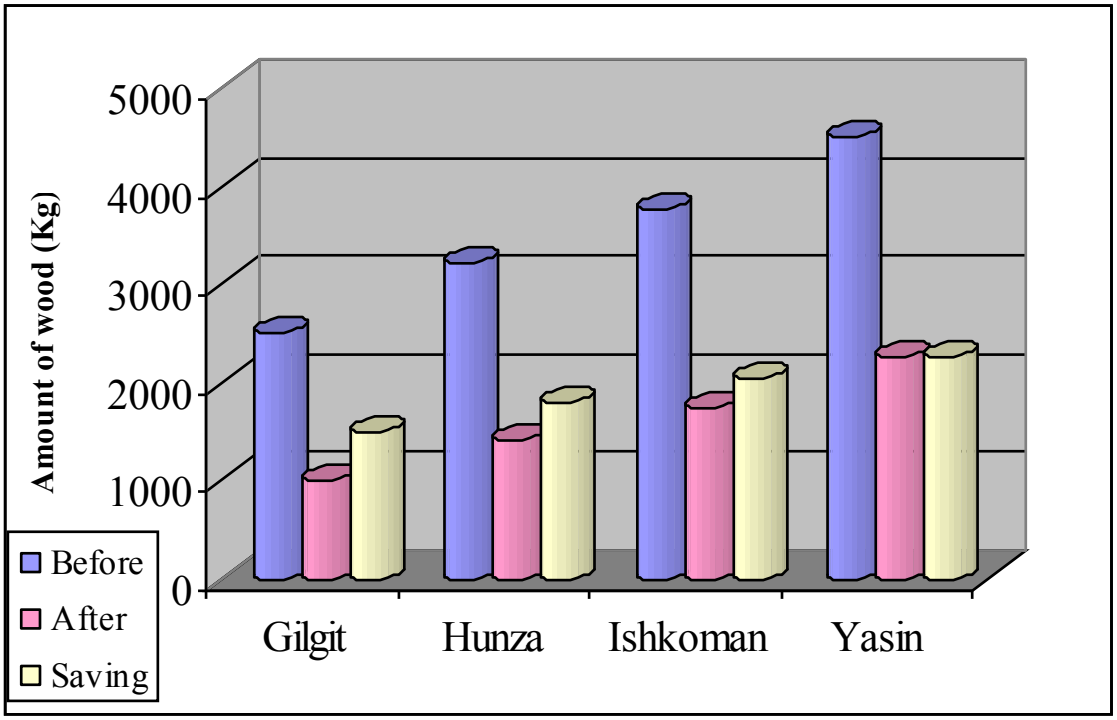
CASE STUDY 2

Mr. Bahadur Khan, 39, is a user of multiple interventions (Roof Hatch Window, Water Warming Geyser and Floor Insulation). He is a resident of Yasin Valley. He is a farmer and supporting a family of nine members. For heating and cooking fuel wood is the only source of energy in his house. Mostly he bring fuel wood from the communal forest, which is located at a distance of about 15 km. Normally it takes 6 hours to cover the distance on walk. Due to high dependency on fuel wood the communal forest is under heavy pressure. To sustain the forest for longer time the local village committee has imposed a ban on the excessive cutting of trees and every household is allowed to bring only 80 munds (one mund equal to 40 kg) of fuel wood from the forest, while the rest will have to buy from the local market. During field survey, Bahadur Khan told his story in detail about the adaptation and advantages of AHITs. According to Bahadur Khan "… *before the installation of BACIP's technologies in my house, the consumption of fuel wood was very high in my house. Every winter we were consuming about 100to 120 munds of fuel wood, while I was allowed to bring 80 munds of fuel wood from the communal forest, and the rest, I was buying from the local market at the rate of Rs.250 per mund. One day, I saw a BACIP team, installing a RHW on the roof of my neighbor. I asked about it and my neighbour told me about the benefits of RHW. Later on, I discussed it with my wife, and we decided to buy a RHW. After the installation of roof hatch window, it greatly reduced my wood consumption almost by 50%. After RHW, I didn't buy any extra fuel wood, instead,there was a 30 mund surplus. Now I bring the share of my wood from the forest and sell the surplus in the local market and earn about Rs. 7,000 to 8,000. Due to this extra income I was able to buy to buy WWF and Floor Insulation for my house. I am extremely satisfied with the economic benefits of these interventions".*

Source: Field visit, summer 2008

together save about 0.46 million kg of wood, worth Rs. 2.15 million[11]. Projecting the figure for the entire Northern Areas (about one hundred thousand households), the people of the Northern Areas would be able to save 210 million kilogram of wood each year; worth about Pak rupees one billion if all households had access to AHITs.

Figure: 5.7 Impacts of AHITs on Fuel Wood Consumption During Winter



Source: Field Survey, 2008

5.6.1.2 Saving in Medical Expenses

The analysis of data shows that the installation of AHITs has a vital impact on common diseases in the area. According to the field survey the most common diseases before the introduction of AHITs in the study area during winter season were infectious diseases mainly caused by the presence of smoke inside the living area due to burning fuel wood

[11] In the study area, on average each household consume 3475 Kg of fuel wood, average price of wood is Rs. 4.7 per Kg. With 55% saving, 240 households will save 240x4.7x1911= Rs.2155608 or Rs 2.1million.

in the absence of a fuel-and smoke-efficient stove[12], absence of a proper ventilation system, and poor insulation in the house. According to Yasmin Beg, a resident of Hunza Valley and a user of multiple housing improvement products (Roof Hatch Window, Wall & Floor Insulation, and WWF) she is of the view that "*due to the installation of BACIP's housing improvement products now our house is clean and our life is much easier, now we burn less wood and there is no more smoke in my house, due to the availability of warm water 24 hours a day, my kids wash their hands regularly and the domestic hygiene of our family has increased significantly and in my family there is a remarkable decrease in the incidence of common winter diseases like cold, cough, flu, pneumonia and skin infection"* (Source: Field survey, 2008)

The analysis of data supports the statement of Yasmin Beg. In the present research, the most frequently mentioned diseases in interviews in the study area were respiratory infections, pneumonia, asthma, eye infections, cold & cough, flu and rheumatism. The analysis of the data shows that the AHITs have a significant impact on the occurrence of these diseases in the study area. Table 5.9 and Figure 5.8 suggest that due to the adoptation of the AHITs by the surveyed households the incidents of sundry diseases in their households have reduced by more than 40%[13].

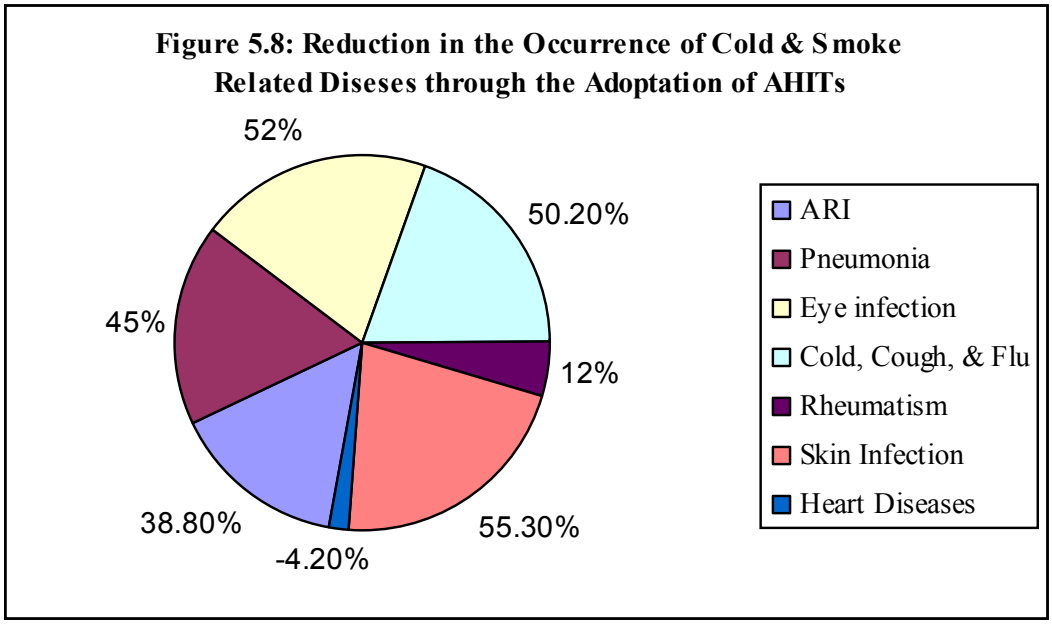
[12] Before the introduction of fuel and smoke efficient stoves (FES) people were either using their old traditional stoves or making open fire for heating and cooking causing excessive smoke inside the house

[13] The information provided in Table 5.9 is based on the memory of respondents. To validate this information the author visited the Northern Areas Health Department and Aga Khan Health Services to get data about the number of patients who have visited is health centers but did not get any data from these two organizations.

Table 5.9: Frequency of Common Diseases Before and After the Introduction of AHITs in the Surveyed Households in the Study Area

Type of disease	Gilgit		Hunza-Gojal		Ishkoman		Yasin		Total	
	# of cases Before	# of cases After	# of cases Before	# of cases After	# of cases Before	# of cases After	# of cases Before	# of cases After	# of cases Before	# of cases After
ARI	37	19	54	32	61	39	57	38	209	128
Pneumonia	56	28	44	25	79	43	70	41	249	137
Eye infection	48	21	59	27	63	34	82	55	252	137
Cold, Cough, & Flu	230	103	215	110	268	139	280	143	993	495
Rheumatism	69	58	81	73	105	91	121	109	376	331
Skin Diseases	41	16	37	20	45	19	47	21	170	76
Heart diseases	19	19	23	21	13	15	16	19	71	74
Total	500	264	513	308	634	380	673	410	2320	1362

Source: Field Survey 2008



Source: Field Survey 2008

Figure 5.8 show that the highest reported impacts of AHITs was on incidence of skin diseases and skin infections which has reduced by 55.3%. Before the initiation of BACIP's Water Warming Geyser in the study area, the condition of personal hygiene like

washing of hands, particularly of small children, taking of regular bath, and regular washing of cloths, was not satisfactory. Due to unhygienic domestic conditions, skin infections were common. After the introduction of the BACIP's Water Warming Geyser (WWG) in the surveyed households, now warm water was available and people were able to keep their domestic hygienic condition clean.

CASE STUDY 3

Mr. Aslam Khan, 36, is a resident of Iskoman. Mr. Aslam Khan participated in a group discussion, which was held in Ishkoman Valley. During the discussion he narrated his story about the impacts of AHITs on his household. Mr. Aslam Khan has two products (Roof Hatch Window - RHW, and Water Warming Geyser - WWG) in his house. According to Aslam Khan, before the installation of these products in his house, there were many winter weather issues in his house. The most common were the presence of excessive smoke inside the house, excessive use of fuel wood due to the loss of heat through the roof hole, and absence of natural light. In 2005 there was a BACIP's road show in his village and he also participated in it. In the road show he saw many BACIP's products and BACIP's officials were explaining the benefits of these products. *"I get very impressed with the benefits of these products. I decided to buy a roof hatch window. At that time there was no cash money with me, so I took a loan from my VO's account and purchased a roof hatch window. After the installation of RHW, it amazingly reduced my fuel wood consumption in winter and I saved about 50% of my fuel wood. Every year, I was spending about Rs. 10,000 to 12,000 on fuel wood. After the installation of RHW I spent only Rs.6000 and saved Rs. 4000, while the price of the RHW was Rs.2500. Due to its significant economic benefits then I also installed Fuel Efficient Stove – FES with WWG. These products have solved most of my housing issues, now there is no smoke inside my house. Further, due to availability of warm water for hand washing and other uses, now in my house the incidence of common diseases is also less. Before the installation of these products, I was spending more than Rs.2000 on common diseases but last year (2007) I spend only Rs. 600 on treatment of these diseases. I am very happy with these AHITs as it has many economic and other benefits. I will suggest transferring of these technologies to other areas to further increase its social and economic benefits."*

Source: Field Survey, 2008

A World Health Organization (WHO) report concluded that consistent evidence exists that exposure to bio-mass smoke increase the risk of a range of common and serious diseases in both children and adults (WHO, 2002). Most notable among these diseases are acute lower respiratory infections (pneumonia) in children. The report also identified respiratory infections from solid fuels including fuel wood is one of the 10 leading risk factors responsible for substantial causes of death and disability particularly in young children. Indoor smoke from solid fuels causes an estimated 1.6 million deaths annually

and accounts 2.7 percent of the global burden of diseases (WHO, 2002). Almost all respondents were agreed that the AHITs substantially reduce the amount of smoke inside the house. The data indicate however, these technologies have no impact on the frequency of heart diseases in the area. Rather than reduction, there was a small increase in frequency of patients reporting suffering from heart diseases. One of the reasons may be that heart disease is precipitated by excessive and long exposure to indoor smoke, while these households have recently adopted AHIT's. Impacts on heart diseases and other diseases like rheumatism may not be evident for some time.

It is a common assumption that sickness and disease take away a significant portion of household income especially in rural households where people reside in congested and unhygienic environment (Sara, 2005). In the study area, there are some basic public health services, and the Aga Khan Health Services are also operational, so people generally have access to basic or primary health service. In case of serious illnesses, however, they have to travel long distances from their villages for treatment purposes to Gilgit town or to other major cities of Pakistan.

In the four surveyed valleys, 32% of households were using Aga Khan Medical Centers for treatment of patients, 20.5 % of households were taking patients to the local doctors, 16.5% of households were using Basic Health Units (BHUs) for treatment, 11.7% were using home remedies, 17.3% people were taking their patients either to Gilgit or other major city of country for treatment, depending on the nature of illness and 2% of households have not provided information about their illness treatment place (See Figure 5.9).

The survey reflects that a significant amount of money was being spent on medical expenses as well as related expenses like transporting patient to medical centers and associated costs. The total accumulated amount spent on various diseases before AHITs by the 240 surveyed household in the study area was Rs.786,000 (These expenses include transportation, doctor's fee, medication plus time value spent during sickness that has an impact on the work status of the earning family members).

Figure 5.9: Places of Treatment

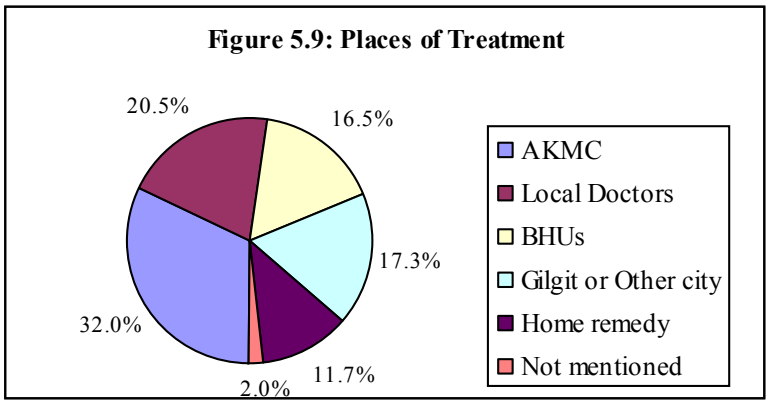
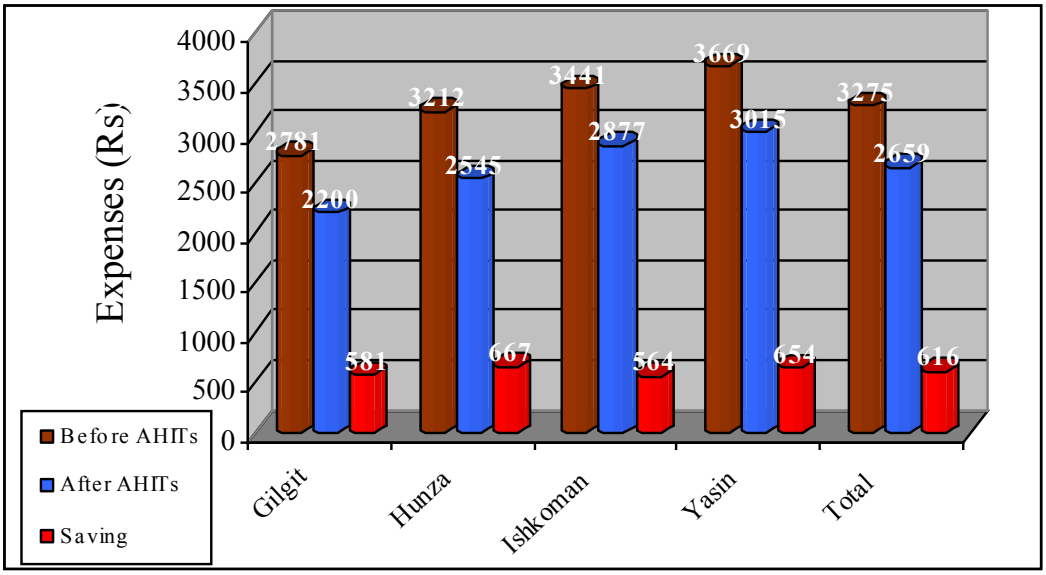


Figure 5.10: Impacts of AHITs on the Health Bill of the Surveyed Households



Source: Field Survey, 2008

Figure 5.10 represents valley-wise the average expenditure of surveyed households on reported diseases. The figure shows that in study area before the installation of AHITs the average spending of the surveyed households on the treatment of common reported

diseases were Rs. 3275, while after the installation of AHITs the average cost of the treatment these diseases dropped to 2659, a saving of Rs 616 per household per winter season. Yasin Valley, which is the remote and relatively poor valley among the four surveyed valleys, had the highest spending on the treatment of these diseases. Figure 5.10 show that before the adoption of interventions the average cost was Rs. 3669 and after installation of AHITs, the cost of treatment of common reported diseases came down to Rs.3015 a saving of Rs. 654 per household per winter season (for details please refer to Figure 5.10 and table 5.10).

Table 5.10: Pattern of Medical Expenditure before and After AHITs in the Study Area

Annual Expenses (Rs)	Gilgit		Hunza		Ishkoman		Yasin	
	Before AHITs	After AHITs	Before AHITs	After AHITs	Before AHITs	After AHITs	Before AHITs	After AHITs
< 1000	16.7 %	26.7%	11.7%	15.0%	10.0%	13.3%	8.3%	11.7%
1000-2000	23.3%	18.3%	18.3%	21.7%	11.7%	20.0%	10.0%	15.0%
2001-3000	21.7%	23.3%	15.0%	25.0%	16.7%	26.7%	18.3%	25.0%
3001-4000	15.0%	20.0%	20.0%	15.0%	23.3%	11.7%	16.7%	13.3%
4001-5000	10.0%	6.7%	22.0%	10.0%	18.3%	13.3%	25.0%	18.3%
> 5001	13.3%	5.0%	13.0%	13.3%	20.0%	15.0%	21.7%	16.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: Field Survey, 2008

5.6.2 Social Impacts of AHITs

5.6.2.1 Impacts of AHITs on Women and Children

As we discussed earlier, in all four valleys, after the installation of the AHITs, the surveyed households spent 50% less on wood and as a result the burden of labour has also reduced by 50%. All women participants (39% of total respondents) were of the view that now their houses are more bright and warm and they have more spare time for doing other productive work like sewing and embroidery and are able to earn extra

money. They claimed that they have some control over family income generated through these additional income-generating activities.

The study suggests there is also a general improvement in domestic health & hygiene conditions within houses. This contributes to improved health conditions, especially for women and children because in winter they spend most of their time inside their houses. The smoke is reduced due to fuel efficient stove (FES), the house is warmer in winter due to insulation of walls/floor and installation of roof hatch windows. The roof hatch window allows the sunlight to enter the house and there is better illumination, it also helps ventilation. Now less labour time is required by women for cleaning house, wood collection and chopping. This leads to improved living conditions and helps in poverty alleviation. During the filed survey (2008) Meher Parveen was interviewed. She is a teacher in Aga Khan Diamond Jubli School Gulmit (Gojal – Upper Hunza Valley). She expressed her opinion about AHITs in the words *"after the installation of roof hatch window, water warming geyser, and floor insulation, now there is no smoke and dust in my house; it is cleaner, brighter and comfortable. I think that AHITS has improved my social status in the eyes of my neighbors and relatives."*

- AHITs are also helping in enhancing the social status of women and reducing isolation, which is an important element in poverty. Women are now thinking about installing further interventions in their houses. Thirty eight percent of the women respondents during the survey revealed that they like to plan or they had planned or taken decisions regarding improving living conditions by installing more AHITs. Thus the Interventions have helped the women come a step forward in decision making regarding their house planning issues.

5.6.3 Impacts of AHITs on Children Education

AHITs have enhanced opportunities for education in many ways. Lowering incidence of cold and smoke-related diseases allow for improved regular attendance at schools which provides an opportunity to children to learn more. After the installation of AHITs like the roof hatch window, smoke efficient stove, water warming Geyser, wall and floor insulation not only increase comfort levels inside the houses and reduce diseases but also allow for children to concentrate more on their studies, as they do not need to spend as much time on fuel wood collection and chopping. Upon asking the question from one of the participants in Sindhi (Yasin valley) about the impacts of AHITs on their children's education, she replied *"yes, the AHITs have significant impacts on the education of my children, now my children go to school more regularly, particularly in winter as they seldom get sick."*

Further, a majority (73%) of the respondents were of the view that due to less smoke and better domestic hygiene, now their children got fewer diseases and as a result can more regularly attend school. Sixty nine percent respondents were of the view that due to less smoke and more light inside the house, children could spend more time inside the house and now their children are able to complete their school homework on time.

5.7.1 Impacts of AHITs on Environmental Conservation

The Northern Area of Pakistan has unique climatic conditions and very fragile ecosystems. Saving the natural wood forests provides a foundation for the overall conservation process. Forests are the lifeline for all the flora & fauna in the region. The amount of fuel wood consumed annually by the inhabitants of the Northern Areas is destroying the forests at an extraordinary speed. Abbasi and Ahmed (2003) mentioned

that in the Northern Areas every year each household use more than 5000 Kg of fuel wood for heating and cooking. For meeting this demand, people not only cut trees from farmlands and forest but also use bushes and shrubs. Due to loss of vegetation cover, it encourages soil erosion. Therefore, if cutting of forest trees for fuel wood is not checked, studies suggest that the Northern Areas will be devoid of forests within next 10 to 15 years (Rao and Hamid 2003). The unique animal species which are already decreasing in numbers survive primarily by virtue of the few remaining forests in the region. A number of organizations both in public and private sectors like the World Wide Fund (WWF), International Union for Nature Conservation (IUCN), Aga Khan Rural Support Program (AKRSP), Aga Khan Planning and Building service, Pakistan (AKPBSP) and various government departments are making multiple efforts for conservation of the natural forests. The high demand for fuel wood and lack of availability of alternative sources of energy has a degrading effect on all the conservation efforts. Stopping soil erosion, reducing deposition of silt in the down stream dams, enhancing wildlife habitat, and many other ecological concerns require sustainable use of the natural forest resources of the area. There is a dire need to reduce the fuel wood consumption practice in the region by bringing in alternative energy sources. According to the survey 76% of the respondents were of the view that the AHITs developed by BACIP would help to reduce the demand for fuel wood for heating and cooking, 63% were of the view that there is a need for alternative sources of energy including hydroelectricity, solar power, wind and coal to reduce alarming rate of deforestation. Forty nine percent of respondents said that we should plant more trees on farmlands for fuel wood, 38% were of the view that the government should impose a ban on cutting of forests trees for fuel wood consumption,

while 2% of respondents were unable to provide any suggestions. Until the time that new energy sources become available, interventions designed for reducing fuel wood consumption are an ideal application at the household level and will continue to be of great importance. The amount of fuel wood, which could be saved with thermal efficient housing products on a mass scale, can save forests to a great extent (Abbasi and Ahmed, 2003). Results of the study suggest that AHITs can reduce the demand for fuel wood more than 50%. This means that if people consume 50% less fire wood, then there would be 50% less emission of green house gases.

5.7 Socio-Economic Profile of Skilled Labour

As mentioned earlier in the methodology section, in order to collect information about the impacts of AHITs on skilled labour of the study area (separate questionnaire was designed and data were collected from those artisans that have received training from BACIP). The purpose was to study in detail the impacts of these interventions on the socio-economic status of skilled individuals and to assess if these interventions were helpful in reducing poverty prevailing in the skilled cohort. The survey teams identified the skilled labourers with the help of key informants in each village. A total of 49 artisans were interviewed in the four valleys. Table 17 shows some of the demographic characteristics of the respondents.

Table 5.11 shows that in the study area a majority (57.2%) of the skilled artisans involved in AHITs were between the age groups of 16 to 35 years, with majority (93.9%) males and only 6.1 percent females.

The majority of the respondents (36.7%) were masons, followed by carpenters (32.7%). The number of tinsmiths were 9 (18.3%) and only six (12.2%) of the respondents were sales persons.

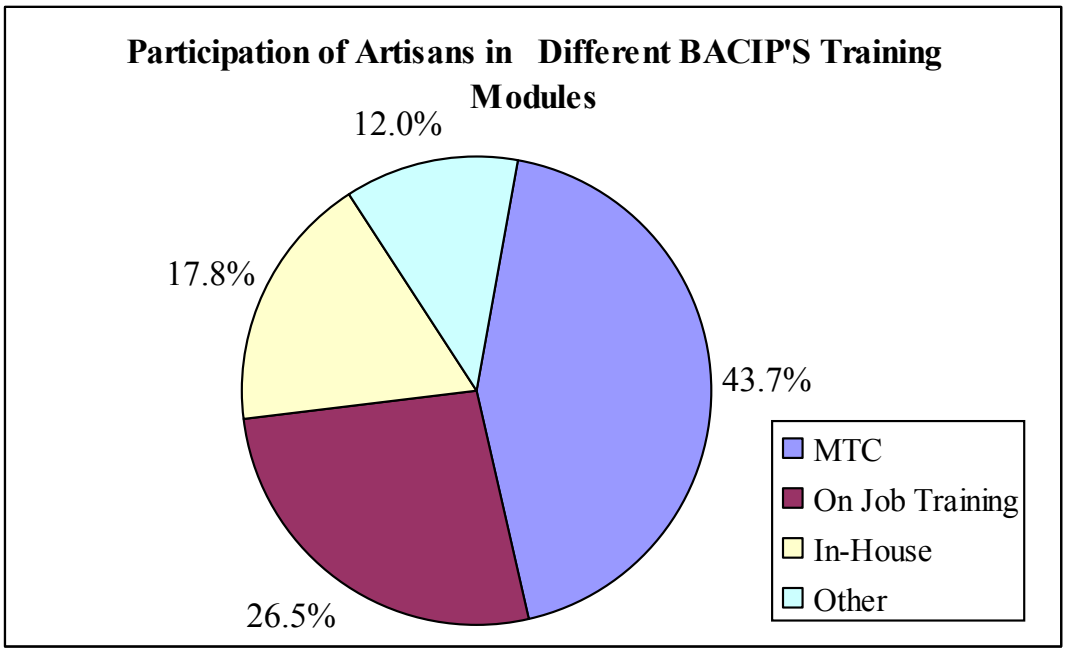
BACIP offers a variety of training modules to artisans to enhance their skills and learn the manufacturing and realization process of AHITs

Table 5.11: Demographic Characteristics of Skilled Respondents

Characteristics		Gilgit		Hunza		Ishkoman		Yasin		Total	
		#	%age	#	%age	#	%age	#	%age	#	%age
Age	Less than 15 years	1	2	-	-	1	2	-	-	.2	4
	16 to 35 years	8	16.3	7	14.2	7	14.3	6	12.2	28	57.2
	36 and above years	6	12.2	5	10.2	5	10.2	3	6.1	19	38.8
Gender	Male	15	30.6	11	22.4	12	24.5	8	16.3	46	93.9
	Female	-	-	1	2	1	2	1	2	3	6.1
Total Number of Cases		15	30.6	12	24.5	13	26.5	9	18.4	49	100
Marital status	Married	12	24.9	10	20.4	12	24.5	9	18.4	43	87.8
	Unmarried	3	6.1	2	4.1	1	2	-	-	6	12.2
Trade	Mason	5	10.2	3	6.1	6	12.2	4	8.2	18	36.7
	Carpenters	6	12.2	5	10.2	3	6.1	2	4.1	16	32.7
	Tinsmith	4	8.2	2	4.1	2	4.1	1	2	9	18.3
	Sales persons	-	-	2	4.1	2	4.1	2	4.1	6	12.2

Source: Field Survey, 2008

Figure 5.11 shows the type of training received by each individual artisan from BACIP. According to figure 5.11, the highest percentage (43.7%) of respondents attended a *"Mobile Training Course*", 26.5% of respondents participated in "*On the Job Training*", 17.8% of respondents participated in *"In House Training"* and 12% of respondents were involved in other training modules of BACIP.



Source: Field Survev. 2008

5.8 Impacts of AHITs on the Skilled Cohort of the Study Area

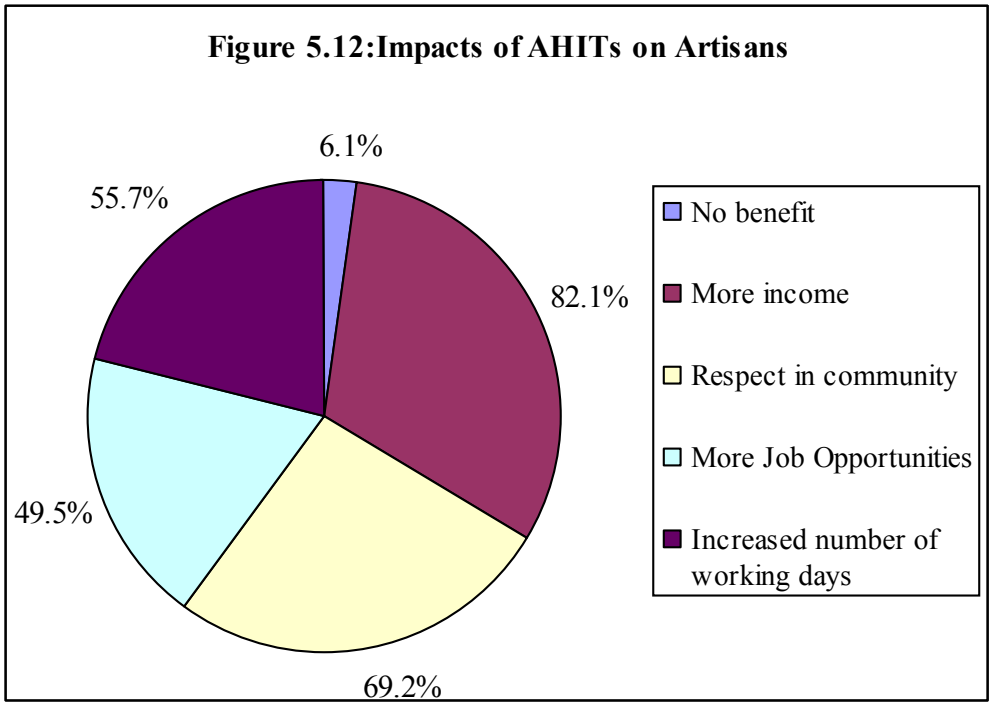
The AHITs have had significant and multiple impacts on the lives of skilled individuals of the study area. The data suggest that a majority (95%) of the respondents felt that enhancing skills had a positive effect on their lives. They reported that their new skills have not only improved their income levels but now they have more respect in the community. Table 5.12 & Figure 5.12 show the impacts of AHITs on the artisans of the study area. It is clear from the data that a majority (82.1%) of the respondents believed their enhanced skills and their involvement in the realization of AHITs has increased their income levels. Fifty five percent respondents were of the view that the training on AHITs has not only increased their daily wages but they have also increased their number of working days and as a result now they are able to earn more for their family. Similarly, 49.5% respondents said that before AHITs they were unable to find work particularly in winter but now they are able to find work even in winter. In The Northern Areas of

Pakistan, skilled individuals are considered a valuable asset of the area and they have a respectable position in the community. From this perspective 69.2% of respondents were of the view that the training on AHITs has enabled them to manufacture/install AHITs locally and provide it on low prices to their own community.

Table 5.12: Respondents' Perceptions Regarding their Skills Enhancement

Types of benefits Associated with Skill Enhancement	Gilgit	Hunza	Ishkoman	Yasin	Total
	Percent	Percent	Percent	Percent	Percent
No benefit	-	-	2.1	4.2	6.1
More income	79.6	77.6	87.7	83.6	82.1
Respect in community	59.2	67.3	61.2	75.0	69.2
More Job Opportunities	29.3	58.7	63.3	71.7	49.5
Increased number of working days	42.8	53	67.3	69.6	55.7

Source: Field Survey, 2008



Source: Field Survey, 2008

5.8.1 Impacts of Skill Enhancing Training on the Skill Level of Artisans

Participation in a particular training module does not necessarily ensure enhancement in the skill of participants. To assess whether the participants have learned desired skills by participating in various BACIP training modules, so that these individuals can serve the community in terms of AHITs, various questions were asked of the participants about the effectiveness and viability of training session(s) they have attended. According to the survey, majority of the respondents (19 or 38.8%) were of the view that the training modules were effective in enhancing their skills so that after training, they were better able to independently manufacture and install AHITs related to their trade. Thirty two and half percent respondents reported lack of availability of proper tools for making and installation of AHITs. Seventeen percent of

CASE STUDY 4

Mr. Karim Khan, 39, is a resident of Gilgit town. By trade he is a carpenter. He is also owner of ASK Enterprises, a small factory in Gilgit town that manufacture AHITs. For the last 5 years Karim Khan is working with BACIP as a master trainer. Before joining BACIP he was working as a carpenter on daily wages and he was earning about Rs.200 per day. The availability of work was also highly uncertain, in summer season on average he was working for a maximum of 15 days per month. In winter season due to less construction activities he was hardly getting 10 days work per month. Due to less work opportunities and low level of daily wages, financially he was very depressed. In 2003 he got training from BACIP on the manufacturing of AHITs and later on became a master trainer of BACIP on AHITs. In 2005 he got a loan of Rs. 100,000 from the First Micro Finance Bank and established a small factory for making AHITs and starts supplying AHITs to local people. Due to the high demand for AHITs in Gilgit and surrounding areas he was unable to meet the demands, therefore, he hired other workers for meeting the demands. Presently he is working not only in summer but also in winter. Usually he works 25 to 26 days a month (only Friday off), and earn about Rs.1000 to 1200 per day. During the interview Mr. Karim Khan expressed his views about the impacts of AHITs reducing poverty in the region in these words *"... AHITs have not only reduced poverty in my house but also in the houses of many artisans in the Northern Areas. Before getting training on AHITs, due to low skill level, I was hardly earning Rs. 200 per day and most of the time, particularly in winter season it was very hard to find a work. The BACIP training on AHITs has greatly enhanced my skill level. Now finding a work is not a problem for me and I am working regularly throughout the year, even some time I work on weekend also. Now I am earning more than Rs.1000 per day and my earning are more sustainable. Now, I am able to support my family and provide better health and education facility to my children. Furthermore, there are another five people who are working with me (ASK) and earning bread for their families. All this was only possible through AHITs."*

Source: Field Survey, 2008

respondents said that due to the short duration of training modules, they were unable to learn all the skills required for making AHITS. Six respondents (12.24%) said that they were totally unskilled before joining training, therefore, they were unable to learn any skills in the training and were unable to make or properly install any AHITs even after receiving training from BACIP.

5.8.2 Impacts of AHITs on the Income Level of Artisans

It is a general assumption that skilled individuals are able to earn more than unskilled persons. The present research also confirms this assumption. The skilled artisans of the study area reported been able, to earn a more sustainable and better living as compared to unskilled labourers of the region. In the entire study area, more than 80 percent of the artisans' respondents said that the training on AHITs had increased their earnings. According to the survey, 81.63% of the respondents were of the view that before getting training on AHITs they were earning less than Rs. 5000 per month before getting training on AHITs, 11% were able to earn Rs. 5,000 to 10,000. Only 8% of respondents were able to earn more than Rs. 10,000 per month. On the other hand, after getting training from BACIP on AHITs and enhancing their skills, income levels show a definite increase as reflected in table 5.12.

5.13 Impacts of Skill Enhancement Training on the Income Level of Artisans

Monthly Income (Rs)	Gilgit		Hunza-Gojal		Ishkoman		Yasin		Total	
	% Before	% After	% Before	% After	% Before	% After	% Before	% After	% Before	% After
< 5000	13.3	-	25	8.3	46.1	23	55.6	33.3	28.8	16.2
5001-8000	66.7	26.7	58.3	50	38.5	46.1	33.3	33.3	49.3	39
8001-10000	20.0	33.3	16.7	25	15.4	23	11.1	22.2	15.9	25.9
10001-12000	-	20	-	16.7	-	7.7	-	11.1	6	13.9
>12000	-	20	-	-	-	-	-	-	-	5
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Field Survey, 2008

Table 5.13 shows the impacts of AHITs on the income level of artisans. It is clear from the table that before training on AHITs in the entire study area no artisan was earning Rs. 10,000 and above per month, while after training on AHITs 14% of artisans were earning between 10,000 and 12,000 per month and another 5% were able to earn more than Rs.12,000 per month.

CASE STUDY 5

Ms.Safina Bibi, is a widow and belongs to Iskoman. She is the sole breadwinner of an eight member's family. A few years ago her husband died of heart attack and her father and mother-in-law are too old to work in the fields. After the death of her husband, she is responsible to look after her family. She has no regular source of cash income and basically she is doing farming, but to earn some cash she is also doing sewing and embroidery. In 2004 BACIP start working in Ishkoman Valley and she join BACIP as an independent sales person. BACIP does not provide any fixed salary or other benefits to its sales persons and the sales persons work independently and only get ten percent commission of the price of the items they sold. When Safina Bibi joined BACIP as a sales person, BACIP provide her some tools and a basic training of products assemblage, sales and marketing. Initially, she was unable to sell products easily and quickly but she worked hard and consistently and gradually learned how to get clients. In 2007 beside other products she sold 36 WWG and 29 RHW and earned Rs.19850 as a commission (Rs. 350 for WWG and Rs. 300 for RHW). According to Safina Bibi *" ...before joining BACIP as a sales person the economic condition of my family was not good. My family was without any regular source of cash income. I was getting very little cash from my stitching/sewing and embroidery work. I was unable to continue the education of my kids and I was thinking to discontinue their education. Then I joined BACIP as a sales person, although working as a BACIP's sales person is a difficult job but it is also a rewarding job. Presently I am selling about ten products per month and on average I am getting Rs. 300 per product i.e. Rs 3000 per month which is the highest source of cash income for my family. Without this money I will not be able to continue the education of my children or to buy other needs of life."* Source: Field Survey, 2008

The data further indicates that after getting training on AHITs the respondents were able to find work

easily within their own communities as well as in nearby villages and towns. According to the survey around 89.8% of respondents said that after getting training on AHITs now they were able to find work in their own villages, while 79.6% respondents said that after training from BACIP, now they have no difficulty to find work in nearby communities and even in Gilgit city and other towns. Some of the respondents (10.2%) were not willing to work in their own villages. They said that in their own villages, most people are not ready to pay them according to their enhanced skills and local people demand work on a credit basis and then later on they are not willing to pay. After training from BACIP they can find work easily in other villages and towns, where they work without any credit and get better wages.

A significant percentage of respondents also utilized their skills for personal home improvements. Table 5.14 shows details.

Table 5.14: Place Where Work Opportunities Available for Artisans

Place of Work	Before Training on AHITs		After Training on AHITs	
	Frequency	Percentage	Frequency	Percentage
In the village	44	63.2	31	89.8
Nearby Villages	27	55.1	39	79.6
In the nearest town	13	26.5	33	67.3
Other cities (out side NAs)	2	4.1	16	32.6

Source: Field Survey, 2008

5.9 Transfer of AHITs to other regions of Pakistan and Abroad

It is an important aspect of the present research to consider whether it is possible to transfer AHITs to other regions of Pakistan and abroad. According to field survey 31% respondents were of the view the Northern Areas of Pakistan has a unique socio-culture and physical environment. Since the AHITs introduced by BACIP had been designed based on the environmental setting of the Northern Areas, these respondents believed that

it is not possible to transfer these technologies to other regions of Pakistan or other parts of the world. On the other hand 69% respondents said that, although these technologies had been designed in the context of the Northern Areas of Pakistan, it is possible to transfer BACIP's developed AHITs to other parts of Pakistan. For successful transfer of these technologies to other parts of Pakistan and to other regions of the world, respondents suggested a number of parameters that must be adopted before the process of transformation. These parameters are listed below:

i. Need Assessment;

The respondents were of the view that before transferring the AHITs to other regions it is essential to identify the socio-cultural and physical environment of the proposed area or region. Ninety percent of the respondents agreed that some of the AHITS can be transferred to only those regions of Pakistan and other regions of the world that have similarly socio-cultural like the Northern Areas of Pakistan. In this regard the respondents identified that Roof Hatch Window can only be installed on a house with a hatch, or Fuel Efficient Stoves (FES), or Water Warming Geyser (WWG) can be replicated in areas where people use, fuel wood for heating and cooking. Therefore, it is necessary to identify the needs of the local people before the transfer of these technologies. Accessibility and presence of basic infrastructure;

Infrastructure like road networks plays a vital rule in the development of an area. If an area has poor road networks and the area is inaccessible, then it will be difficult to provide goods and services. The respondents were of the view that the potential area must be accessible and have a reasonable road network so that the material required for AHITs could be provided to them.

ii. Availability of Skilled Artisans;

Skilled artisans play an important role in the manufacturing and installation of AHITs. All the respondents agreed that the sustainability of the whole process mainly depends on the availability of local skilled artisans. As learning of a new skill is a time consuming activity and the present BACIP's training modules can only enhance the existing skill level of the artisans. The results indicate, with the available training modules, it is extremely difficult for BACIP to develop the skills of non-skilled persons to the level that may be able to manufacture and install AHITs.

iii. Awareness raising about the technologies;

Awareness rising is an integral part of the transformation process. The respondents were of the view that awareness rising will reduce the risk of lack of acceptance of these technologies. If the people of the proposed area know about the benefits of the new technologies, then they are likely to accept them.

iv. Support Price;

According to the respondents the present prices of the AHITs are very high (please refer to Appendix IIV). People in the Northern Area are interested in AHITs but due to extreme poverty in the region and relatively high prices of these items, the majority of the people are unable to afford them. To reduce the prices of AHITs it is necessary for BACIP to provide proper training to local artisans so that they may be able to manufacture these items locally, further, the government should tax exemption on items required for the manufacturing of AHITs. If prices of the AHITs are reduced, then people not only in the Northern Areas but also in other areas would have better access to them.

CHAPTER 6: CONCLUSION AND RECOMENDATIONS

6.0 Introduction

The following pages contain conclusions of the research and present a number of recommendations.

6.1 Conclusion

Based on the review of literature, and analysis of data, we can conclude that the technologies developed by Building and Construction Improvement Program (BACIP) in the Northern Areas of Pakistan can be consider as Appropriate Housing Improvement Technologies (AHITs). These technologies have all the essential characteristics of any appropriate technology.

The analysis of data confirms that extreme poverty prevails in the study area. There are various social, ecological and environmental factors that are directly or indirectly responsible for the persistent poverty in the area. Based on focus group discussions and interviews with many other individuals in the field pointed out that AHITs have multiple socio-economic and environmental benefits but still it is not possible to eliminate the underlying causes of poverty and degradation of the physical environment in the region through the initiation of any single project/program or through the instigation of few technologies/techniques. Still, the findings of the study are encouraging. The results of the study suggest that the AHITs are playing considerable role in alleviating poverty in the households that have installed AHITs and can play an effective role if all household have access to AHITs in the region. Thus AHITs could be used as innovative instrument for the economic development of the region.

The literature suggests that some of the basic elements essentially required for the development of a healthy community include:

• Clean and safe physical environment;

• Diverse and vital economy;

• Protection of the natural environment and responsible use of resources to ensure long term sustainability;

• Adequate access to shelter, income, and less incidences of common diseases; and

• Opportunities for learning and skill development (Leonard J. 2003);

The analysis of data indicates that the AHITs are very helpful in reducing the level of smoke inside the houses contributing towards a cleaner environment. Similarly AHITs are also helpful in reducing the demand for fuel wood by 50% helping in conserving the natural forest resources of the area. Based on the results of the present research we can conclude that AHITs are contributing towards the development of health community in the Northern Areas of Pakistan.

The literature suggests that income generation or enhancement is one means of alleviating poverty (BACIP, 2000). On the other hand, there is very little emphasis in the literature on where poor people spend their income and how unproductive and unwanted expenses can be reduced or avoided (ibid). This research on Appropriate Housing Improvement Technologies (AHITs) developed by Building and Construction Improvement Program addresses that gap.

The present study shows that AHITs are also contributing to provide sustainable livelihoods to the local artisans, sales persons and business owners engaged in the manufacturing, installation and sales of these technologies. The results of the study

illustrate that the training and capacity building approach of BACIP has some weaknesses: short duration of training for individuals with no previous skills, unavailability of manufacturing tools, and lack of essential capital for procurement of material required for the manufacturing AHITs. If these weaknesses were addressed, then BACIP will be able to implement its training and capacity building approach more effectively.

The training provided to local artisans on AHITs is helping them to enhance their skills and create better and more sustainable livelihoods for their families. The analysis of data shows that people involved in the manufacturing, installation, and trading of AHITs are now earning more income. Similarly, people using AHITs are also able to save more. The study confirms that AHITs are helping local people to reduce unwanted expenditures, releasing resources for productive activities. The analysis of the data shows that the AHITs have multiple impacts on the socio-economic and environmental settings of the area. Through the adoption of AHITs people are able to save up to 60% on fuel wood. If these technologies were adopted at mass scale, people in the Northern Areas could potentially reduce their cost of fuel wood up to rupees one billion[14] and, in addition, have a very positive impact on conservation of precious forest resources of the Northern Areas. AHITs are very helpful in reducing cold and smoke related diseases in the study area. Households that have AHITs installed have less incidence of diseases like Acute Respiratory Infection (ARI), pneumonia, eye infection, cold cough & flu and other diseases related to cold and smoke. These households spend less money and time on the treatment of these diseases.

[14] Rs. One billion = US $16.2million

AHITs have also a positive impact on the lives of women and children in the region. The study showed that in the Northern Areas, women and children are responsible for collection and chopping of fire wood. Due to less demand for fire wood, therefore, they have a lesser workload and women of the study area utilize their spare time in other productive activities like sewing, netting and embroidery. Due to these activities now women are able to earn some extra income for their families. The study showed that children also benefit from the installation of AHITs in their households. Now they get fewer diseases and as a result attend school more regularly. Due to less smoke and more light inside their house they do their homework easily.

The study shows that burning less fuel will have a very positive impact on the forest resources of the area leading not only to environmental conservation, but it will also help in stopping soil erosion, reducing deposition of silt in the down stream dams, and enhancing fragile wildlife habitat of the region.

Key informant interviews carried out for the study also suggest that it may be possible to transfer these technologies to other parts of Pakistan and also to other regions of the world having similar socio-economic and environmental conditions.

6.2 Research Recommendations

The recommendations have been separately formulated for program and policy level institutions. Most of the recommendations are based on the findings of the field research (based on interview questions and focus group discussions). Some recommendations are based on the literature review supplemented by field experience of the researcher while working with BACIP.

6.2.1 Research Recommendations at the Program Level

1. Development of awareness and promotional strategy:

On the basis of discussion with the local management of AKPBSP and with other local respondents it seems that AKPBSP is lacking an awareness and promotional strategy. A good promotional and awareness strategy will sustain the current level of interest of the communities in the AHITs and will also increase it further. It is therefore, recommended that the program should develop an effective awareness and promotional strategy;

2. Sensitization of local Inhabitants about Environmental Issues:

The AHITs developed by BACIP have a positive impact on the environment of the area. The analysis of data shows that there is great reduction in the use of fuel wood in these areas after introduction of BACIP products. More installation of AHITs would mean lesser and lesser use of fuel wood that in turn will reduce deforestation and resultantly there will be less soil erosion, minimum loss to the biodiversity and less damage to the ecosystem at large. Therefore, it is recommended that BACIP should make environmental sensitization a key component of its awareness campaign for the education of the communities especially the young children through organizing more road shows in school and colleges of the area;

3. Installation of Multiple AHITs

The study revealed that wall insulation is a very effective technique for retention of heat inside the room in extreme weathers but is of little use in the presence of

that traditional hole in the roof. Similarly the Fuel Efficient Stove can help to reduce the demand for fuel wood but again due to the traditional hole in the roof, it is not possible to warm the house without the treatment of the traditional hole or without insulating the walls. It is recommended that the use of fuel efficient stoves should be encouraged in combination with roof hatch window and wall insulation technique. The BACIP field staff should inform the communities of the interrelationship between various AHITs;

4. Reducing Prices of the AHITs

Price plays an important role in purchasing or installing one or multiple AHITs. The study suggests that to get maximum benefits from the AHITs, the user should install multiple AHITS. People in the Northern Areas are relatively poor and they are unable to afford multiple AHITs. Therefore, it is suggested that BACIP should low cost versions of AHITs through using more local materials, so that all the people have access to AHITs.

5. Diversification in the Installation of AHITs

BACIP has developed/identified about 40 different types of AHITs out of which 20 have been successfully tested in the field. To date, BACIP with help of its artisans and entrepreneurs has installed 12000 products in various villages of the Northern Areas. Of these 12000 products, 95% are four AHITs. It is suggested that BACIP should encourage the installation of other AHITs also, particularly Wall Insulation, Solar Cooker and Solar Water Heater through incentive based promotion stratagy;

6. Targeting Poorest of the Poor:

The analysis of the data revealed that the beneficiaries of the BACIP products were not the poorest of the poor. Instead the major beneficiaries were relatively well off people and to some extent the middle class families. It is also a possibility that BACIP should provide AHITs to the poorest people on subsidized prices. BACIP should explore avenues for how poor families can benefit from the products to enhance the overall impacts of the products by reaching to more international donors;

7. Working in Non-traditional Areas

BACIP is a project of the Aga Khan Planning and Building Service, Pakistan which is an institution of the Aga Khan Development Network (AKDN) working under the direction of His Highness The Aga Khan, who is the spiritual leader of the Ismaili Muslims. In spite of the fact that BACIP is a donor funded project, its work is limited to only those areas where Ismaili Muslims are in majority (Map at Appendix VI shows the relationship between ethnic distribution and activities of BACIP). Working for a particular ethnic group or a particular geographical area will potentially increase the relative poverty in the region as some people will be more advantaged than others;

8. Development of a Micro-Credit System for the Purchase of AHITs:

During the field survey and also in the focus group discussions participants identified that people are interested in buying more AHITs but were unable to afford them. It is suggested that the BACIP should try to develop linkages

between entrepreneurs, micro-credit lending agencies and the community. This will also enable the poorest of the poor to install these products. Establishment of a revolving fund could be one option that can be explored;

9. Quality Assurance:

In some areas the users of AHITs were not totally satisfied with the quality of the products. It is suggested that BACIP should intervene in this area immediately by proper monitoring of the installed products through its monitoring and evolution staff, otherwise low quality products will be sent into the market by profiteers and the trust of the community in the these products will vanish.

10. Training of Artisans:

AKPBS/BACIP's has developed a number of training modules, but all of these modules are of short duration (maximum two weeks). Thus, the economic impacts of these trainings on individuals who were unskilled prior to such training were negligible. It is recommended that AKPBSP should revise thoroughly its various training modules with the help of a well-reputed vocational training institution(s) like Allama Iqbal Open University (AIOU) or Peshawar School of Technical and Vocational Education (PSTCE) and should developed separate training modules for skilled and unskilled individuals.

6.2.2 Recommendations for Policy Level Institutions

1. Development of Alternative Sources of Energy:

The study showed that due to the absence of alternative sources of energy, people are using fuel wood as primary source of energy for heating and cooking. Only 10% of people in the study area are using other sources of energy including liquefied petroleum gas (LPG) cylinders, kerosene oil, and electricity for heating. Therefore, to reduce pressure on the existing forest resources of the Northern Areas, it is necessary for the government of Pakistan to provide alternative sources of energy to local inhabitants. The alternative resources must be affordable as the people of the region are extremely poor. Some of the possible alternative resources identified are hydroelectricity, solar energy and wind energy.

2. Use of AHITs in the Public Sector Buildings:

The Northern Areas Public Works Department (NAPWD) is responsible for the construction and maintenance of buildings constructed in the public sector including schools, hospitals and building for all government departments. Buildings are constructed by the Northern Areas Public Works Department without insulation. Due to non-insulated constructions these buildings are extremely cold during winters and hot in summer. Therefore, the government with the collaboration of The Aga Khan Planning and Building Service, Pakistan should encourage the use of insulating techniques developed by Building and Construction Improvement Program (BACIP).

3. Incorporation of Environmental Issues in the School and Colleges Curriculum:

To inform the youth about the environmental issues of the area it is therefore necessary to incorporate the various issues in the schools and colleges curriculum. This will provide them an opportunity to understand the root cause of these issues and in future they will be able to take informed decisions about such environmental challenges at all levels from local to national.

4. Incorporation of Appropriate Housing Improvement Technologies in the poverty alleviation programs:

Presently (2009) the Government of Pakistan, GoP, with the collaboration of World Bank and other donor organizations has developed a poverty reduction program called 'Pakistan Poverty Alleviation Fund – PPAF' (http://www.ppaf.org.pk/). Under PPAF, GoP, is supporting a number of projects for the alleviation of poverty implemented by both government and Non-governmental Organizations (NGOs). The AHITs can help in alleviating poverty in the region; therefore, the GoP should support BACIP and other organizations to initiate the installation of AHITs in other regions of the country. This will not only achieve the objective of PPAF but will also help in conservation of the environment.

5. Rebate in Sales Tax:

To encourage the installation of AHITs at mass scale, it is necessary to reduce its prices, therefore, it is suggested that the government should provide sales tax

rebate on items required for the manufacturing/realization of AHITs to individuals involved in its manufacturing/realization.

6.3 Final Remarks

The objectives of the present study were to evaluate the role of AHITs in poverty elevation and environmental conservation in the Northern Areas of Pakistan. To achieve these objectives the following research questions were developed:

- Do AHITs have an impact on alleviating poverty in the study area?
- Do AHITs have a positive impact on environmental conservation?
- Can the effectiveness of AHITs can be enhanced? If so how? And
- What do the study results suggest about whether AHITs may be useful in other regions of Pakistan and abroad for reducing poverty and enhancing environmental conservation?

Based on the analysis of both primary data and secondary data and synthesis of the relevant literature, it can be concluded that AHITs have a considerable impact on poverty alleviation and environmental conservation in the study area. The study suggest that AHITs are helping in reducing poverty in the region through reducing cost of fuel wood, cost of maintaining a house, and reduction in medical bills. AHITs are also helping artisans and entrepreneurs in enhancing their income. At the same time we can conclude that economic impacts of AHITs are very limited as AKPBSP (BACIP) is working in a very limited geographical area. In more than ten years (from 1997 to 2008), BACIP worked in only 77 villages out of 1200 villages (about 6%) in the region. In terms of conservation, the study suggest that after the installation of AHITs the people are using

50% less fuel wood as a result emit 50% less green house gases. Regarding the question of effectiveness of AHITs the results suggest that the AHITs are more effective when they are used collectively. The study suggests that it is possible to transfers AHITs to any region of Pakistan having similar socio-economic and environmental conditions.

Based on the results of the study we can conclude that if every one has access to AHITs, then there will be more income generating opportunities for people, people will be able to save more, there will be fewer incidences of diseases that can lead to a long and healthy life, children will be able to attend schools regularly, and as a result increase in literacy and as a result, Pakistan will be able to enhance its HDI ranking in the global community.

The research was successful in addressing the research questions, but at the same time there emerged new questions which require further research. Some of the questions that emerged as a result of this study are given below:

i. AKPBSP is not working in the entire Northern Areas but mostly working in those areas where a specific ethnic group is living. Now the question is whether providing benefits to particular ethnic group or particular geographical area will effectively decrease the level of relative poverty in the Northern Areas?

ii. The results of the study showed that when different AHITs are used in a specific combination they are more effective, but how can the efficiency of each individual AHIT can be enhanced?

iii. Similarly, further research is required to determine the efficiency of AHITs particularly Fuel Efficient Stoves (FES), and Water Warming

Geyser (WWG) in terms of green house gases (GHG) emission. There is a need to quantify the actual amount of GHG that could be saved through the use of AHITs?

iv. Finally the question of whether growth in income is translated into a better housing environment for citizens specifically in a spatial context needs to be investigated and documented more thoroughly. In fact such an investigation will establish the relationship between poverty alleviation and access to better housing.

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Appendix I

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Questionnaire for impact analysis of AHITs (BACIP's technologies)

Name of Interviewer:_____ Education level of interviewer_____

Name of the HH: _____ Education level of the HH: _____

Valley:_____ date: _____

Demographic information:

1. Total number of families in HH_____

2. Total number of persons in HH_____

Age group	Male:	Female		Male:	Female
0-5			36-50		
6-18			50-60		
19-35			61-+		

3. Avg. monthly income of the HH Rs. _____

4. Expenditure breakdown

i. Food Rs._____ ii. Cloth Rs._____ iii. Education Rs._____

iv. Health Rs._____ v. Energy Rs._____ vi. Travel Rs._____

5. Type of house:

i. Traditional:-

a. Type of construction, Roof_____ Walls_____ Floor:_____

b. Total rooms_____, bedroom(s)_____, living room_____, guest room(s)___, kitchen_____

2. Non-traditional:

a. Type of construction, Roof_____ Walls_____ Floor_____

b. Total rooms_____, bedroom(s)_____, living room_____, guest room(s)___, kitchen_____

Sources of Energy during winter

1. Do you use fuel Wood for heating and cooking? Yes [ ] No [ ]

If yes, for a. Heating b. Cooking c. Both

2. Do you buy fuel Wood? Yes [ ] No [ ]

If yes, from where_____?

How much you spend on buying fuel wood Rs._____?

3. Do you collect fuel wood? Yes [ ] No [ ]

If yes, from where you collect fuel wood _____?

How much time you spent on collecting fuel wood (days)._____?

4. Do you use coal for heating and Cooking? Yes [ ] No [ ]

If yes, for a. Heating b. Cooking c. Both

How much money you spend on buying coal Rs._____?

5. Do you use dung cake for heating and cooking? Yes [ ] No [ ]

If yes, for a. Heating b. Cooking c. Both

How much time you spend on making and drying dung cake (time in days)_____?

6. Do you use LPG (gas cylinder) for heating and cooking? Yes [ ] No [ ]

If yes, for a. Heating b. Cooking c. Both

How much money you spend on buying gas cylinder Rs._____?

7. Do you use electricity for heating and cooking? Yes [ ] No [ ]

If yes, for a. Heating b. Cooking c. Both

How much money you spend on electricity Rs._____?

Sources of energy during summer

1. Do you use fuel wood for cooking? Yes [ ] No [ ]

2. Do you buy fuel wood? Yes [ ] No [ ]

If yes, how much money you spend on buying fuel wood Rs. _____?

Do you collect fuel wood? Yes [ ] No [ ]

If yes, from where you collect fuel wood _____?

How much time you spent on collecting fuel wood (days)._____?

3. Do you use coal for cooking? Yes [ ] No [ ]

If yes, how much money you spend on buying coal Rs._____?

4. Do you use dung cake for cooking? Yes [ ] No [ ]

If yes, how much time you spend on making and drying dung cake (time in days)_____?

5. Do you use LPG (gas cylinder) for cooking? Yes [ ] No [ ]

If yes, for how much money you spend on buying gas cylinder Rs. _____?

6. Do you use electricity for cooking? Yes [ ] No [ ]

If yes, for how much money you spend on electricity Rs. _____?

Appropriate Housing Improvement Technologies / products (AHITS)

1. Do you have information about BACIP Appropriate Housing Improvement Technologies / products (AHITS) ? Yes [ ] No [ ]

If yes, about which product / technology?

i._____ ii. _____ iii. _____

iv. _____v. _____ vi. _____

2. How many BACIP's technologies (AHITs) are in your house and what are there advantages / disadvantages?

1. i._____ ii. _____

iii. _____ iv _____

2. i._____ ii. _____

iii. _____ iv _____

3. i._____ ii._____

iii. _____ iv _____

4. i._____ ii. _____

iii._____ iv _____

3. Do you think that the BACIP products/ technologies have positive impact on the conservation of natural resources (forests) of the area? Yes [ ] No [ ]

If yes, how: i._____ ii._____

iii._____ iv _____

Health impacts of BACIP products

1. What are the common diseases in your area?

i._____ ii. _____

iii._____ iv _____

v. _____vi. _____

2. What are the common diseases in your own house?

i._____ ii. _____

iii. _____ iv _____

3. Do any one of your house hold suffering from: i. Heart diseases ii. Lung cancer iii. Skin allergy iv. Joint pain

4. Where you take the patients for attending doctor

_____?

5. How much is your average monthly health bill of your household, Rs._____?

6. How much time you spend or distance you covered for taking the patient for treatment?

Time (in hours)_____/ distance (in kms) _____

7. Do you think that BACIP's technologies / products help in reducing these diseases?

Yes [ ] No [ ]

If yes how? i._____ ii. _____

iii._____ iv _____

8. Do you think that it is possible to transfer BACIP products / technologies to other regions of Pakistan and abroad? Yes [ ] No [ ]

If yes, How? i._____ ii. _____

iii. _____ iv _____

Appendix II

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Training and Capacity Building

(This questionnaire will be filled only from artisans that have got training form BACIP).

1. Do you get any skill enhancement training from BACIP?

Yes [ ] No [ ]

If yes, what type of training you got from BACIP?

i. Mobile training course, ii. in-house training, iii. on-job training, and or iv. out-source training

2. Where did you have this training?

i. at your own village, ii. at another village, iii. in BACIP office, and or at some other location

3. What was your occupation before BACIP training?

_____

4. What is your present occupation?

_____

5. Did the BACIP's training meet your expectations?

Yes [ ] No [ ]

If yes, how give example

i._____

ii. _____

If no, give reason(s)

i._____

ii. _____

6. Did the contents and duration of the training was sufficient?

Yes [ ] No [ ]

If, no why?

i._____

ii.

_____

7. Did the BACIP training was helpful in enhancing your skills?

Yes [ ] No [ ]

If, no why?

i._____

ii. _____

iii._____

iv._____

7. In your opinion what are the major benefits of BACIP training?

i. More employment opportunities, ii. Better wages iii. Increase in work-days

iv. Enhanced social status v. Any other

8. Are you involved in making/realizing any BACIP product(s)/technologies?

Yes [ ] No [ ]

If yes what product(s)/technologies?

i._____ ii. _____ iii. _____

iv. _____v. _____ vi. _____

9. Do you have all the necessary tools and material for making product(s)/technologies?

If, no why?

i._____

ii. _____

If , no give the reason(s)

i._____ ii. _____ iii. _____

iv. _____v. _____ vi. _____

10. What are the total numbers of skilled artisans in your village that can make /realize BACIP products / technologies? _____

Appendix III

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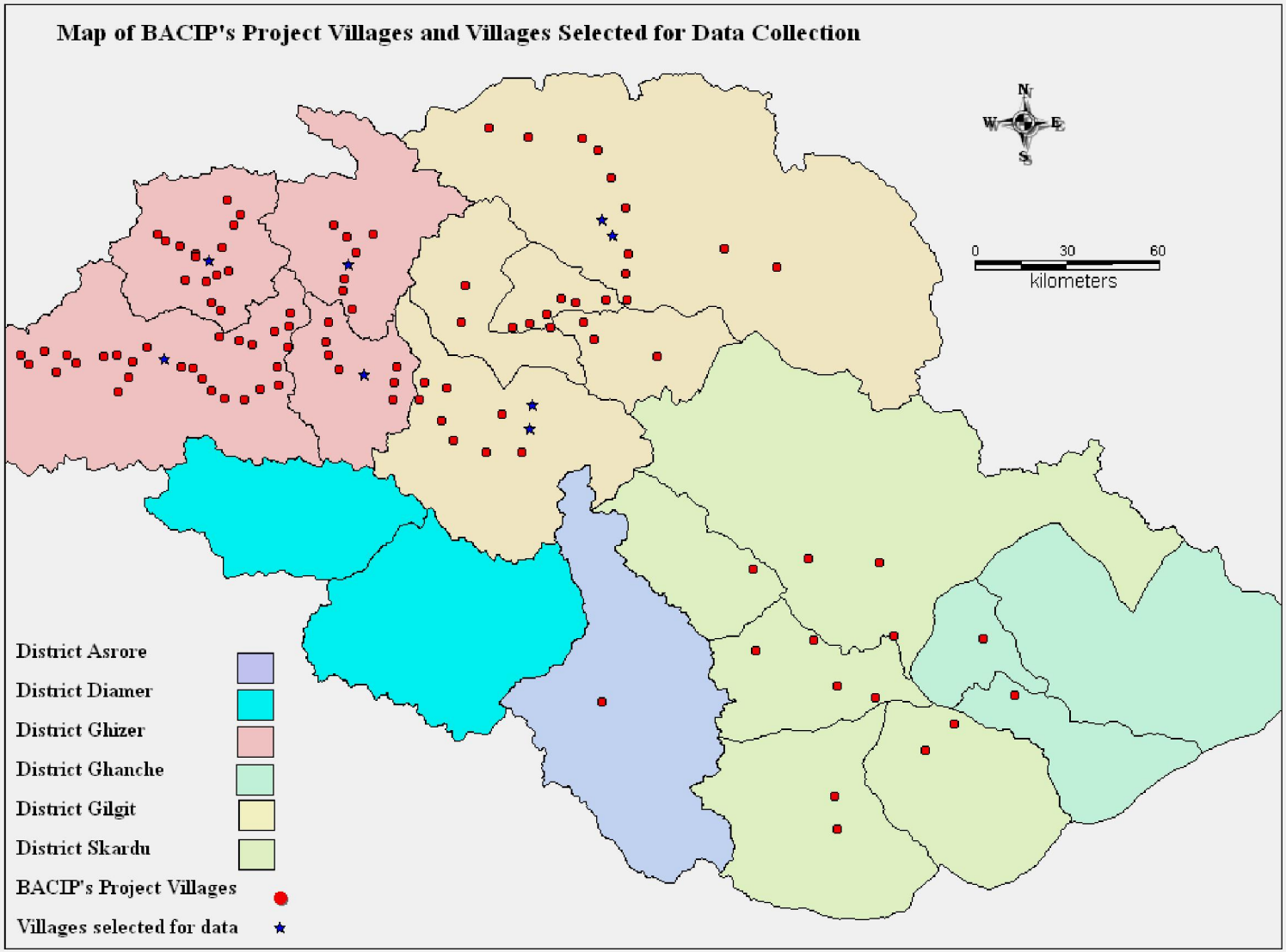
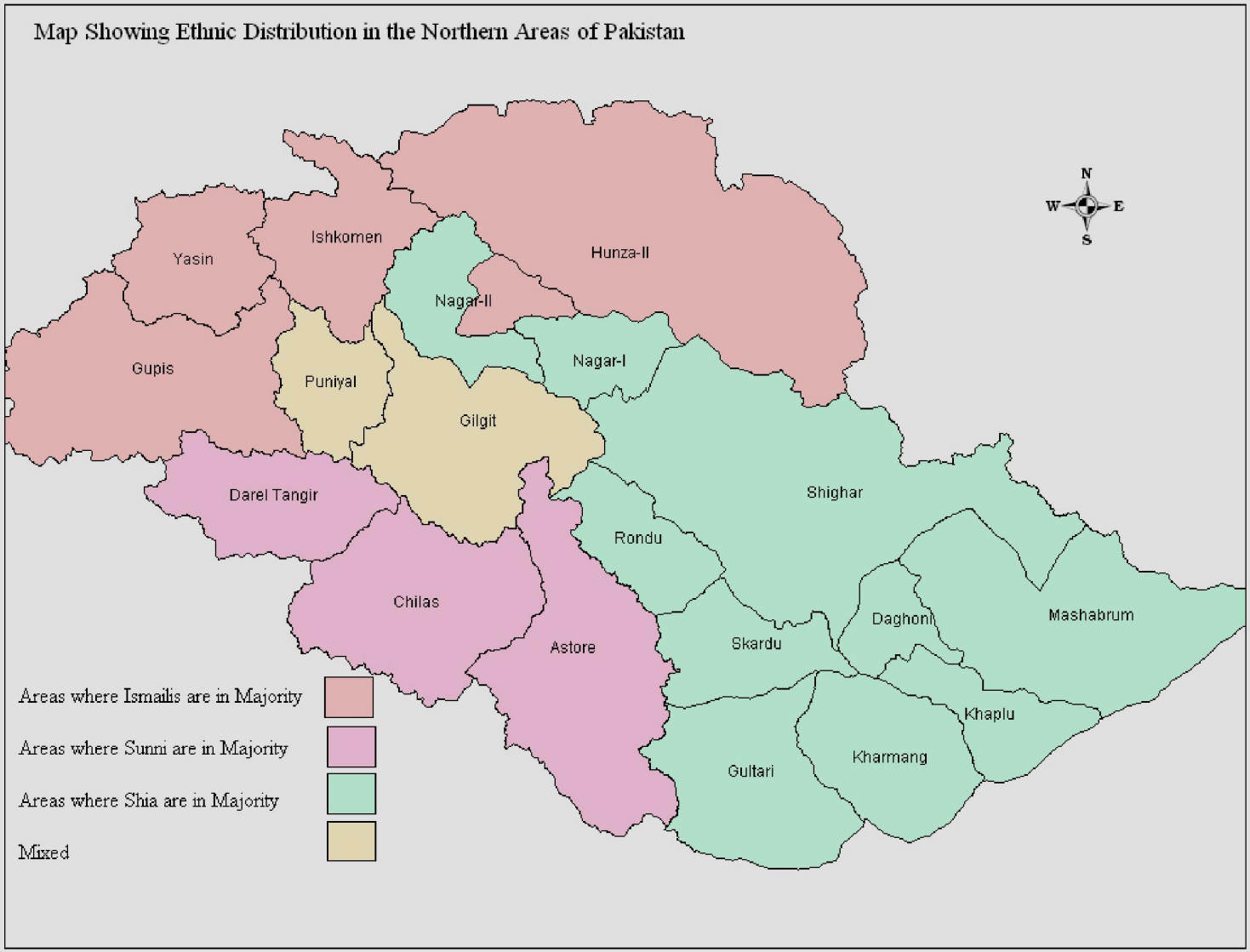
Questions for Focus Group Discussion

1. In your opinion what are the most common housing issues of the Northern Areas of Pakistan?
2. Do you think that the appropriate housing improvement technologies (AHITs), developed and introduced by BACIP address these issues?
3. What are housing the issues that BACIP has unable to address?
4. Do you think that the skill enhancement programs (Mobile Training Course, On-job training, and In-house training) of BACIP are effective in developing the skills of local artisans?
5. Do you think that skilled artisans are available in the local areas for the implementation of BACIP appropriate housing improvement technologies?
6. Do you think that through adaptation of appropriate housing improvement technologies (AHITs), we can reduce the poverty level in the region?
7. Do you think that appropriate housing improvement technologies (AHITs), are helpful in reducing the incident of diseases related to indoor smoke?
8. In your opinion what are the basic characteristics of a healthy society, and do you think that appropriate housing improvement technologies (AHITs) are helpful in developing a healthy society?
9. Do you think that it is possible to transfer the appropriate housing improvement technologies (AHITs), to other parts of Pakistan and to other regions?
10. Any other comments/suggestions

Location Map of Northern Areas of Pakistan Appendix IV


Map of BACIP's Project Villages and Villages Selected for Data Collection
N
W
E
S
0
30
60
kilometers
District Asrore
District Diamer
District Ghizer
District Ghanche
District Gilgit
District Skardu
BACIP's Project Villages
Villages selected for data

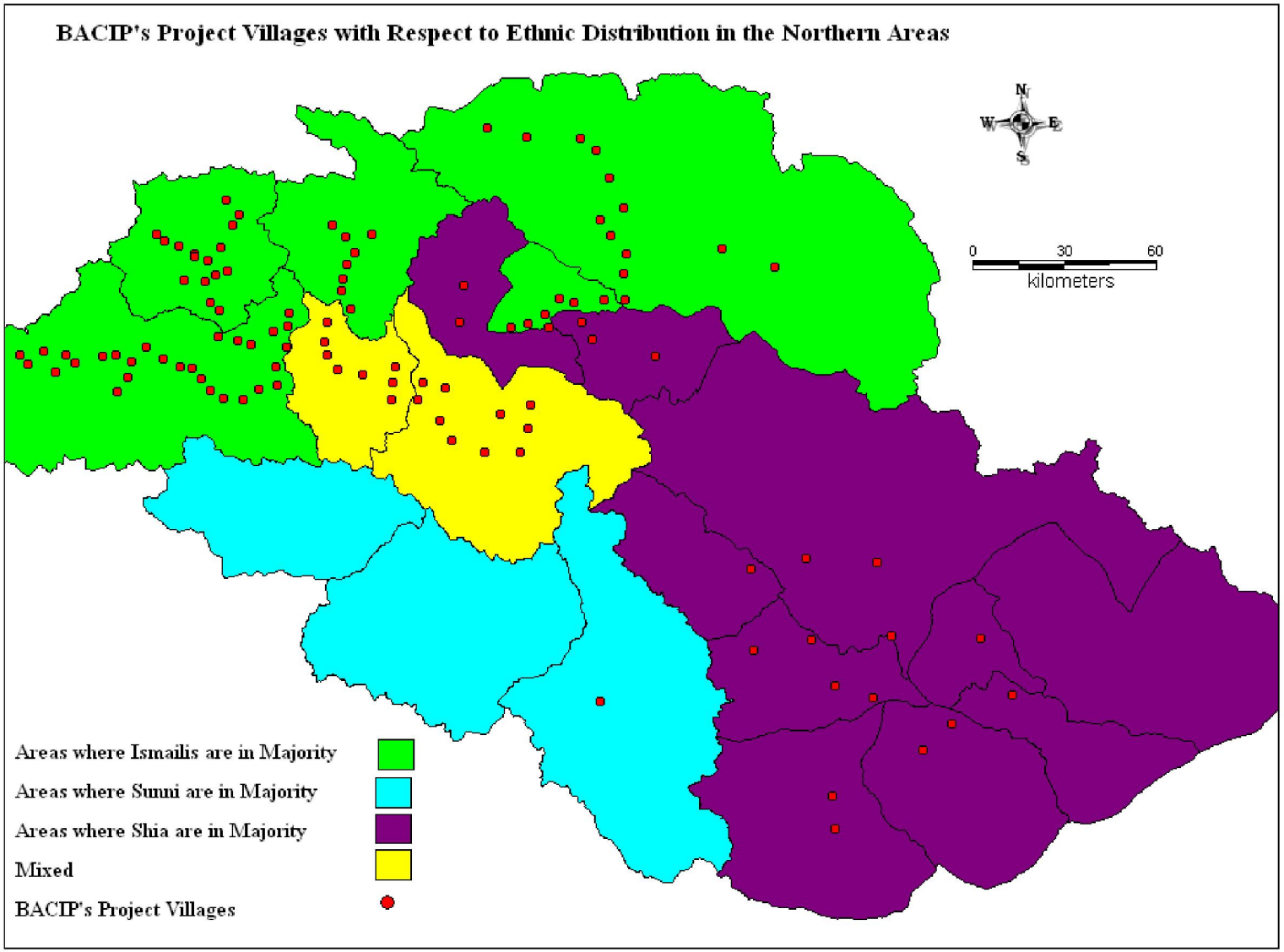
Appendix VI


Map Showing Ethnic Distribution in the Northern Areas of Pakistan
N
W
E
S
Yasin
Ishkomen
Hunza-II
Nagar-II
Nagar-I
Gupis
Puniyal
Gilgit
Darel Tangir
Shighar
Rondu
Chilas
Astore
Skardu
Daghoni
Mashabrum
Khaplu
Kharmang
Gultari
Areas where Ismailis are in Majority
Areas where Sunni are in Majority
Areas where Shia are in Majority
Mixed

Appendix VII

Prices of Selected AHITs (May, 2008)

Name of AHIT	Price in Rupees (Rs.)
1. Roof Hatch Window with Laminated Glass:	Rs. 2800
2. Fuel Efficient Stove Gojal Modal:	Rs. 1800
3. Fuel Efficient Stove Gojal Modal with WWG:	Rs. 2800
4. Fuel Efficient Stove Phunder Modal:	Rs. 2200
5. Fuel Efficient Stove Phunder Modal with WWG:	Rs. 3000
6. Smoke Efficient Saw Dust Stove:	Rs. 1500
7. Solar Cooker Small	Rs. 2200
8. Solar Cooker Medium	Rs. 2500
9. Solar Cooker Large	Rs. 2800
10. Solar Water Heater	Rs. 5000
11. Wall Insulation with Expanded Metal Mesh	Rs. 13 Per Square Feet
12. Wall Insulation with PE Foam	Rs. 18 Per Square Feet
13. Floor Insulation with PE Foam	Rs. 6 Per Square Feet
14. Roof Insulation with cement and stabilized mud	Rs. 6 Per Square Feet
15. Double Glazed Window	Rs. 2500
16. GI Wire mesh 18 inch wide	Rs. 125 Per Kilogram
17. GI Wire mesh 12 inch wide	Rs. 110 Per Kilogram


BACIP's Project Villages with Respect to Ethnic Distribution in the Northern Areas
N
W
E
S
0
30
60
kilometers
Areas where Ismailis are in Majority
Areas where Sunni are in Majority
Areas where Shia are in Majority
Mixed
BACIP's Project Villages